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THESIS

**SAUDI ARABIA'S NUCLEAR POSTURE: IS HEDGING
THE FUTURE?**

by

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September 2016

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SAUDI ARABIA'S NUCLEAR POSTURE: IS HEDGING THE FUTURE?

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ABSTRACT

The Joint Comprehensive Plan of Action (JCPOA) leaves Iran with residual capabilities that positions it for the rapid development of nuclear weapons should it abandon the deal. This thesis examines how the JCPOA affects Saudi Arabia and what actions the Saudis are likely to take. The Saudi premise of “whatever they have, we’ll have” in regard to Iran leans toward a Saudi Arabian nuclear hedging strategy, but is it feasible? This thesis proposes a model that explores the interaction of threat, domestic factors, and current international nonproliferation regimes and how they drive a nation toward nuclear hedging. The model is applied to the cases of Pakistan, a nuclear proliferate nation, and Japan, the archetypical hedging nation, and later to Saudi Arabia. This comparative case study finds that despite its national will, technological factors—such as an impoverished scientific community—make Saudi Arabia’s nuclear hedging untenable at this time. In addition to technical capability, the presence or absence of strong alliances factor into the national decision to hedge or proliferate. This thesis concludes by offering insight into when the United States should reexamine the Saudi Arabian case and what it should consider if the Saudis consider nuclear optionality.

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LIST OF ACRONYMS AND ABBREVIATIONS

CENTO	Central Treaty Organization
CIA	Central Intelligence Agency
DOD	Department of Defense
FCC	Functional Combatant Commander
HEU	Highly Enriched Uranium
IAEA	International Atomic Energy Agency
IRGC	Iranian Revolutionary Guards Council
JPOA	Joint Plan of Action
JCPOA	Joint Comprehensive Plan of Action
KACARE	King Abdullah City for Atomic and Renewable Energy
KANUPP	Karachi Nuclear Power Plant
MTCR	Missile Technology Control Regime
NPT	Treaty on the Non-Proliferation of Nuclear Weapons
NSG	Nuclear Suppliers Group
PAEC	Pakistani Atomic Energy Commission
SEATO	Southeast Asia Treaty Organization
SNM	Special Nuclear Material
URENCO	Uranium Enrichment Consortium
UN	United Nations
USSOCOM	United States Special Operations Command

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I. INTRODUCTION

A. MAJOR RESEARCH QUESTIONS

The process of negotiating the Joint Comprehensive Plan of Action (JCPOA) between leading members of the international community and the Islamic Republic of Iran has illuminated the technical progress of Iran's nuclear program. The negotiated plan leaves a foundation for a nuclear-breakout capability in Iran in exchange for enhanced nuclear safeguards and a limited enrichment capacity. However, Iran's continuing nuclear capability does not eliminate concerns among its neighbours including Saudi Arabia. This thesis poses the following questions: How does the revelation of Iran's progress and capability motivate Saudi Arabia to acquire a nuclear capability to match or surpass Iran? If Saudi Arabia chooses to develop a nuclear capability, what path would it likely take—such as hedging by developing a sufficient capability to enable a nuclear breakout—and which technical capabilities would it need to develop? Finally, assuming Saudi Arabia's progress, what are the policy/treaty implications presented to the nuclear proliferation regime?

B. SIGNIFICANCE OF THE RESEARCH QUESTIONS

The 2015 *National Security Strategy* reads, “No threat poses as grave a danger to our security and well-being as the potential use of nuclear weapons by irresponsible states or terrorists.”¹ The United States recently led the initiative reached in the JCPOA among the Islamic Republic of Iran, the United States, Russia, China, France, and the United Kingdom, the five permanent members of the United Nations Security Council, as well as Germany (P5+1). The agreement attempts to align Iran's nuclear intentions with this policy and reinforces the norm set forth in the Treaty on the Non-Proliferation of Nuclear Weapons (NPT), under which signatories agree not to pursue nuclear weapons. The JCPOA negotiations sought to achieve the goals of the NPT by focusing on

¹ White House, *The National Security Strategy* (Washington, DC: Government Printing Office, 2015), 11.

enrichment levels, weapon-design activities, reactor designs, and the limit of on-hand nuclear material to limit a nuclear-breakout capability. The agreement reaffirms the International Atomic Energy Agency (IAEA) as the inspection regime to ensure compliance with the agreement while the threat of future sanctions should encourage Iran to uphold the treaty. As evident in Israeli Prime Minister Netanyahu's 2015 campaign to deter U.S.–Iranian negotiations as well as the Saudi Arabian monarchy's vocal concerns, the JCPOA has exacerbated the volatile security landscape of the Middle East. Specifically, the JCPOA process has reinvigorated the security concerns of Saudi Arabia, which already has difficult relations with Iran.

The United States has led efforts to reassure the Kingdom in this tumultuous time. However, in light of America's withdrawal from Iraq and Afghanistan and President Obama's 2009 speech in Prague deemphasizing the role of nuclear weapons in U.S. security policy—which alarmed key U.S. allies about the reliability of Washington's extended deterrence guarantees—the Saudis may be rethinking their basic security position. Saudi insecurity has been compounded by Pakistan's reluctance to contribute to the Saudi-led coalition in Yemen, Egypt's chronic instability, Syria's descent into chaos, and the role of Iranian-backed Shia militias in challenging the regional security architecture. The tenuous Saudi monarchy has good reasons to reassess its position.

These research questions build on Steven R. McDowell's thesis from the Naval Postgraduate School (NPS), which analyzed the significance of Saudi Arabia's purchase of Chinese CSS-2 missile systems for potential nuclear proliferation. Specifically, this thesis updates the prognosis through reevaluating the facts since McDowell's publication 13 years ago.² McDowell's thesis concluded that Saudi Arabia might develop its own nuclear arsenal if an adversary acquired a nuclear capability and devalued the United States' ability to provide deterrence.³

² Steven R. McDowell, "Is Saudi Arabia a Nuclear Threat?" (master's thesis, Naval Postgraduate School, 2003), 65–68.

³ Ibid., 63.

To explore Saudi nuclear hedging, this thesis takes into account the changing Middle-Eastern landscape, which includes the Joint Comprehensive Plan of Action, the uptick in regional conflict, the modernization of Saudi strategic-rocket forces, and the renewed emphasis on the Saudis' civil nuclear program. The research focuses on three concerns: Iran's nuclear progress and how that threat motivates the Kingdom of Saudi Arabia to compensate or hedge; the Saudis' domestic actions should they decide to compensate; and the implications for the nonproliferation regime.

C. LITERATURE REVIEW

This literature review identifies material necessary for contextually understanding the Saudi–Iranian security situation to evaluate Saudi Arabia's options through international-relations theory; looks for and evaluates case studies of states that have faced the specter of a nuclear-armed adversary while taking into account the dynamic nature of the present; and places the findings in a context applicable to policy.

The antagonistic nature between Saudi Arabia and Iran sheds light on the present situation. F. Gregory Gause's article, "Beyond Sectarianism: The New Middle East Cold War," provides insight into the Iranian and Saudi Arabian relationship, which is often oversimplified as a bipolar arrangement of Shia versus Sunni vying for power in the Middle East. Gause argues that a new cold war of two powers struggling for regional hegemony has broken out through the influence of regional proxies that sometimes cross sectarian lines.⁴ This work provides context for Saudi Arabia's balance-of-power options in the wake of the JCPOA framework.

As a primer to the international-relations theories at play between Iran and Saudi Arabia, Simon Mabon in *Saudi Arabia & Iran: Soft Power Rivalry in the Middle East* breaks down international relations in the Middle East. Mabon illustrates examples of regionally applied problem-framing from the realist and constructivist schools to provide

⁴ Gregory Gause, "Beyond Sectarianism: The New Middle East Cold War," The Brookings Doha Center, 2014, 6, <http://www.brookings.edu/~media/Research/Files/Papers/2014/07/22%20beyond%20sectarianism%20cold%20war%20gause/English%20PDF.pdf>.

depth and context to Saudi–Iranian relations. Mabon recognizes the existential threat that a nuclear Iran poses to Saudi Arabia and Tehran’s role in managing the perception. He discusses the pro- and anti-Iranian aspects associated with the rivalry.⁵

Using the realist lens, John Mearsheimer’s concept of offensive realism in *The Tragedy of Great Power Politics* scrutinizes state behavior in an anarchic order. Mearsheimer reasons that great powers rationally use offensive military capabilities to ensure their survival and hold others at bay because they can never ascertain another state’s true intentions.⁶ This line of reasoning suggests that in a world where there is no international “9-1-1,” states have reason to be suspicious of offensive gains by other states and may secretly prepare for war.⁷ In this system, states continually improve their security to the greatest extent possible by means at hand. Mearsheimer’s work deserves consideration for its direct application to the Saudi–Iranian strategic situation as these nations debate the merits of building the ultimate offensive weapon. Offensive realism applied to Saudi Arabian security suggests a robust Saudi response to match or surpass Iran’s security gains.

In *The Origins of Alliances*, Stephen Walt describes alliance balancing as aligning with another power to offset a security threat. The security threat that drives balancing may come from a rising hegemon that, if left unchecked, will dominate the region.⁸ Walt discusses the benefits and risks vis-à-vis the perception of strength or weakness when a state allies with stronger or weaker nations.⁹ Walt describes the conditions that initiate balancing: combining power, emphasizing geographic distance, amassing offensive power, or displaying aggressive intentions. Inherent in his hypothesis that states tend to balance, an aggressive state provokes others to align against it. This model fits the case of

⁵ Simon Mabon, *Saudi Arabia and Iran: Soft Power Rivalry in the Middle East* (New York: I.B. Tauris, 2013), 61–62.

⁶ John J. Mearsheimer, *The Tragedy of Great Power Politics*, 2nd ed. (New York: W. W. Norton & Company, 2014), 30–31.

⁷ Ibid., 32.

⁸ Stephen M. Walt, *The Origins of Alliances* (Ithaca, NY: Cornell University Press, 1987), 18.

⁹ Ibid.

Iran's nuclear program and the P5+1. Walt provides a framework for evaluating the options available to Saudi Arabia in response to an aggressive Iran. Based on this theory, one of Saudi Arabia's options is to secure a stronger alliance with the United States or Pakistan.

Zachary Davis in "The Realist Nuclear Regime" provides a critique of realist and idealist approaches to the nuclear proliferation regime by showing how each approach preserves the nuclear status quo. He articulates that power and security issues simultaneously drive proliferation and restrain some states from pursuing nuclear weapons. Davis argues that realist motivations also empower neoliberal institutions that potentially moderate the underlying reasons to proliferate.¹⁰ The intersection of the realist security dilemma and international condemnation provides space for a state to consider nuclear hedging.

In the article "Never Say Never Again," Ariel Levite examines nations that return from the brink of nuclear-weapon acquisition through reversal, restraint, or hedging. Levite provides the following definition for nuclear hedging, on which this thesis builds: "A national strategy of maintaining, or appearing to maintain, a viable option for the relatively rapid acquisition of nuclear weapons, based on an indigenous technical capacity to produce them from several weeks to several years."¹¹ While Levite's definition is fuel cycle-centric, this thesis considers other requirements for a nuclear-hedging strategy, such as building a technical manufacturing base and the prerequisite delivery systems.

To examine the likelihood of nuclear hedging from the liberal perspective, Scott Sagan provides a norms-based model in his widely acclaimed article "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb." He argues that security

¹⁰ Zachary S. Davis, "The Realist Nuclear Regime," in *The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results*, ed. Zachary S. Davis and Benjamin Frankel (Portland, OR: Frank Cass, 1993), 91–92.

¹¹ Ariel E. Levite, "Never Say Never Again: Nuclear Reversal Revisited," *International Security* 27, no. 3 (Winter 2002/03): 69, doi: 10.1162/01622880260553633.

dilemmas are not the only drivers that propel or prevent countries from seeking nuclear weapons; factors such as prestige can affect the national calculation in either direction.¹² Sagan's work provides insight into alternative explanations for proliferation and nonproliferation as a counterpoint to the realist lens in the Middle-Eastern security situation.

In *The Spread of Nuclear Weapons*, Scott Sagan and Kenneth Waltz converse on a range of nuclear issues, from nuclear deterrence and terrorism to disarmament. In his essay "More May Be Better," Waltz offers the pros and cons of nuclear deterrence and, through his discourse with Sagan, establishes why a nation would want to develop a deterrent capability. Waltz asserts that tension between states occurs with unilateral-capability development, that bipolar capabilities provide predictability, and that multipolar capabilities have a calming effect based on uncertainty.¹³ Applied to the Saudi-Iranian situation, Saudi nuclear hedging counters the threat of Iranian nuclear advancement and provides regional stability, a point this thesis examines. Waltz also presents problems with extended deterrence, a method the United States has informally used to keep the Saudis calm in the face of the JCPOA. He asserts that the changing calculus of strategic importance, if not congruent among nations, will erode the deterrent nation's will to act on behalf of the weaker nation.¹⁴

There is debate over whether the Saudis are even capable of pacing the Iranians in terms of technological progress. Fareed Zakaria speaks to the viability of a Saudi nuclear hedge in his op-ed piece entitled "Why Saudi Arabia Can't Get a Nuclear Weapon." He contends that a lack of indigenous skilled workers and a dearth of manufacturing make a

¹² Scott D. Sagan, "Why Do States Build Nuclear Weapons? Three Models in Search of a Bomb," *International Security* 21, no. 3 (Winter 1996): 55, doi: 10.1162/isec.21.3.54.

¹³ Scott D. Sagan and Kenneth N. Waltz, *The Spread of Nuclear Weapons: An Enduring Debate*, 3rd ed. (New York: W. W Norton, 2013), 14–15.

¹⁴ *Ibid.*, 26.

Saudi attempt to match Iranian efforts highly improbable.¹⁵ Other scholars, such as Jeffrey Lewis, contend otherwise, decrying Zakaria's metrics as inconclusive.¹⁶ This debate has even attracted recent comment by Saudi Prince Turki al-Faisal, in which he asserts that Zakaria might eat his words when the first Saudi-manufactured automobile rolls off the assembly line in the next few years.¹⁷ This thesis considers this debate in deliberating over Saudi Arabia's ability to hedge.

Wyn Bowen and Matthew Moran in "Living with Nuclear Hedging: the Implications of Iran's Nuclear Strategy" apply Levite's work to Iran's past actions and relates the study to the Saudi case. Bowen and Moran postulate that the international community has reinforced a norm of hedging through the JCPOA, and Saudi Arabian hedging is already underway. They offer policy prescriptions for the international community to prevent states from undermining the NPT and a further outbreak of nuclear hedging.¹⁸ This thesis builds on this work, taking into account nuclear hedging encompasses other factors than the nuclear-fuel cycle.

James Russell in "Proliferation in the Middle East and the Security Dilemma" provides a succinct overview of irritants in the Middle East that could push Saudi Arabia toward nuclear hedging. In 2013, he asserts that the Saudis are content in offshoring nuclear security to the United States, but further irritation could drive a change in their security calculation. This thesis examines Russell's key point.¹⁹

¹⁵ Fareed Zakaria, "Why Saudi Arabia Can't Get a Nuclear Weapon," *Washington Post*, June 11, 2015, https://www.washingtonpost.com/opinions/saudi-arabias-nuclear-bluff/2015/06/11/9ce1f4f8-1074-11e5-9726-49d6fa26a8c6_story.html.

¹⁶ Jeffrey Lewis, "Sorry, Fareed: Saudi Arabia Can Build a Bomb Any Damn Time It Wants To," *Foreign Policy*, June 12, 2015, <http://foreignpolicy.com/2015/06/12/sorry-fareed-saudi-arabia-can-build-a-bomb-any-damn-time-it-wants-to/>.

¹⁷ Dan Drollette Jr., "View from the Inside: Prince Turki al-Faisal on Saudi Arabia, Nuclear Energy and Weapons, and Middle East Politics," *Bulletin of the Atomic Scientists* 72, no. 1 (January 2016): 22, doi: 10.1080/00963402.2016.1124655.

¹⁸ Wyn Bowen and Matthew Moran, "Living with Nuclear Hedging: The Implications of Iran's Nuclear Strategy," *International Affairs* 91, no. 4 (July 2015): 687–707, doi: 10.1111/1468-2346.12337.

¹⁹ James R. Russell, "Proliferation and the Middle East's Security Dilemma," in *Over the Horizon Proliferation Threats*, ed. James J. Wirtz and Peter R. Lavoy (Palo Alto, CA: Stanford University Press, 2012), 63–64.

A sampling of Congressional Research Service reports details technical, political, and military aspects of Saudi and Iranian security. An example is Christopher Blanchard's *Saudi Arabia: Background and U.S. Relations* produced in September 2015, which gives an up-to-date account of U.S. foreign assistance including military aid as well as Saudi relations with Iran. This report details more than \$90 billion in U.S. military sales to Saudi Arabia since October 2010. These sales include some of the nation's most technologically advanced systems, including Apache Longbow helicopters and Patriot air-defense systems.²⁰ Figures such as these demonstrate the robust nature of the U.S.–Saudi military relationship. Blanchard explains, “Saudi leaders remain skeptical of Iran’s intentions and some non-official but prominent Saudis have suggested that the kingdom could seek nuclear ‘parity’ with Iran or other unspecified options when the agreement is implemented.”²¹ He goes on to describe Saudi plans to develop up to 16 nuclear power plants by 2040 with assistance from Argentina and South Korea.²² These accounts build a case for the Saudi hedge and outline a potential path.

In *After the Joint Comprehensive Plan of Action: A Game Plan for the United States*, Ilan Goldenberg et al. from the Center for a New American Security provide timely, relevant analysis of the “Iran deal,” asserting that it could drive Saudi Arabia toward a unilateral approach.²³ In further policy analysis, the authors suggest that the United States must reassure the Gulf States to prevent their hedging against Iran’s enrichment program. Goldenberg et al. also highlight the challenges of achieving a formal mutual U.S.–Saudi defense treaty given Saudi Arabia’s human rights challenges.

In case studies of full nuclear-program development, some states have defied international norms to acquire nuclear weapons. Among the cases of India, Pakistan, Iraq,

²⁰ Christopher M. Blanchard, *Saudi Arabia: Background and U.S. Relations* (CRS Report No. RL33533) (Washington, DC: Congressional Research Service, 2016), <https://fas.org/sgp/crs/mideast/RL33533.pdf>.

²¹ Ibid., 15.

²² Ibid.

²³ Ilan Goldenberg et al., *After the Joint Comprehensive Plan of Action: A Game Plan for the United States* (Washington, DC: Center for a New American Security, 2015), <http://www.cnas.org/sites/default/files/publications-pdf/CNAS-Report-Iran-Agreement-oct-2015-final.pdf>.

North Korea, Israel, and South Africa, Pakistan's march to nuclear means is the most comprehensive case. Feroz Khan's *Eating Grass: the Making of the Pakistani Bomb* presents an account of how a nation with a struggling economy and technological deficit channeled national will in the face of an existential threat to overcome the political, economic, and technological barriers to produce the its bomb.²⁴ Reviewing another possible path of procurement, Henry Sokolski writes in *Underestimated: Our Not So Peaceful Future* that Saudi Arabia could attempt to buy a weapon from China or Pakistan or, at a minimum, seek a technical boost to its civilian nuclear infrastructure to produce a weapon.²⁵

A review of key documents and commitments provides a better definition of the nuclear policy regime. These documents range from international treaties and agreements, such as the NPT and the JCPOA, to bilateral agreements regarding nuclear energy. The core document of the international nuclear-policy regime is the Treaty on the Non-Proliferation of Nuclear Weapons (NPT). This document and its associated agreements provide international norms based on three pillars: nuclear nonproliferation, nuclear disarmament, and peaceful uses of nuclear energy.²⁶ The primary document was signed by 189 nations, and half of those nations ratified the amendment that established the IAEA's access to nuclear sites. Ironically, Iran has only just agreed to the additional protocol with the signing of the JCPOA, but Saudi Arabia has yet to adopt the amendment.

The signing of the Joint Comprehensive Plan of Action reinvigorated the Saudi–Iranian nuclear-security debate. Its signing has drawn foreign and domestic criticism, so an in-depth review of its tenets should help frame compliance and violations.

²⁴ Feroz Khan, *Eating Grass: The Making of the Pakistani Bomb* (Palo Alto, CA: Stanford University Press, 2012).

²⁵ Henry D Sokolski, *Underestimated: Our Not So Peaceful Nuclear Future* (Arlington: Nonproliferation Policy Education Center, 2015), 940–95.

²⁶ United Nations, “Treaty on the Non-Proliferation of Nuclear Weapons (NPT),” Accessed September 11, 2016. <https://www.un.org/disarmament/wmd/nuclear/npt/>.

Other applicable regimes include the Missile Technology Control Regime (MCTR) for which a consortium of 34 nations has agreed to limit missile-technology proliferation. The Zangger Committee and the Nuclear Suppliers Group oversee the nuclear item “trigger list” that manages nuclear technological trade.²⁷ Key U.S. government documents include items such as the 2008 Memorandum of Understanding between the United States and Saudi Arabia Concerning Cooperation in Nuclear Energy and other Fields.²⁸ This document lays out the strings attached to U.S. nuclear-energy assistance; further analysis may uncover that Saudi Arabia does not intend to use U.S. assistance to build the majority of its nuclear infrastructure.

D. POTENTIAL EXPLANATIONS AND HYPOTHESES

To explain the Saudi–Iranian nuclear-security dilemma, the underlying questions of why states proliferate and what factors bring the issue to the forefront of the international community’s concern must be addressed. Mearsheimer writes that a rise in offensive power in one state creates the need to compensate in another. This theory requires that Saudi Arabia match an Iranian threat. Waltz observes that divergent national values between the United States and Saudi Arabia leave the Saudis alone to contend with Iranian aggression. Bowen contends that the international community has established a new norm, yet Iran has supplied the road map for any other state to achieve a nuclear hedge. A potential explanation for Saudi Arabian hedging is a combination of approaches to create an additive model, one that considers threats plus domestic indicators, such as increased defense spending and investment in technological infrastructure, balanced against international norms as an environment ripe for nuclear hedging.

To investigate this hypothesis, three core factors will be unpacked. The first is the threat. This thesis examines what factors have driven other nations to hedge or obtain

²⁷ “Guidelines for Sensitive Missile-relevant Transfers,” Missile Technology Control Regime, accessed September 6, 2016, <http://www.mctr.info/english/guidetext.html>.

²⁸ A Bill to Restrict Nuclear Cooperation with the Kingdom of Saudi Arabia, H.R. 6298, 100th Cong., 2d sess., 2008, <https://www.congress.gov/bill/110th-congress/house-bill/6298/text>.

nuclear weapons. Examples suggest that if Saudi Arabia views Iran as an existential threat, the Saudis will follow through on their rhetoric to match whatever Iran possesses. Second are the domestic factors, such as delivery-system development, manufacturing infrastructure, or space-launch programs. Third are the external costs to the nation in pursuing a nuclear hedge. For example, Iran is watched with scrutiny while Japan is a thriving member of the global community. This hypothesis contends Saudi Arabia will hedge if it perceives the threat as existential, develops the prerequisite technology, and avoids the ire of the international community along the way.

E. RESEARCH DESIGN

This thesis develops an explanatory model using factors of threat, domestic indicators, and international regimes to explain the national decision-space for nuclear hedging. This model uses the case studies of Pakistan and Japan. The Pakistani nuclear case is significant because it represents a nation that directly pursued a nuclear capability in light of a perceived existential threat. The Japan case study explores a country that has mastered the nuclear-fuel cycle yet shows restraint in the face of threats from North Korea and China. The final portion of the thesis applies the model and findings of the case studies to Saudi Arabia to identify relevant policy concerns and recommendations

Comparative case studies serve as the best method to conduct qualitative analysis because of the relatively small number of nations seeking a nuclear hedge. These two case studies have a wide variety of dedicated scholarly literature and provide a solid foundation for in-depth analysis. Real-time reporting provides the context of events as they unfolded during the negotiation and implementation of the JCPOA. For example, Greg Jaffe of the *Washington Post* detailed the King Salman visit in September 2015 that ended with a joint U.S.–Saudi declaration of support for the JCPOA.²⁹ Sporadic glimpses of political rhetoric provide potential indicators of future state actions, such as Prince

²⁹ Greg Jaffe, “Saudi King Visits U.S. with Iran Deal and Yemen as Major Mutual Concerns,” *Washington Post*, September 4, 2015, http://www.washingtonpost.com/politics/saudi-king-visits-the-white-house-to-an-uncertain-welcome/2015/09/04/1bc2a81a-5285-11e5-933e-7d06c647a395_story.html.

Bandar bin Sultan's expressed displeasure with the Iranian deal as reported by Reuters.³⁰ Other reporting, including that by Jeffrey Lewis in *Foreign Policy*, gives insight into events such as the reported Saudi upgrade of its ballistic missiles.³¹ A continued survey of reputable media outlets allows for currency of work and guides research as required

F. THESIS OVERVIEW AND CHAPTER OUTLINE

This thesis is organized as follows. Chapter II explores the factors used for constructing the model to evaluate hedging potential. Chapter III applies the hedge model to the case of Pakistan and its nuclear pursuit. Chapter IV examines Japan and its nuclear hedge. Chapter IV applies the model to evaluate Saudi Arabia. Chapter V presents a conclusion to the thesis and seeks to answer whether Saudi Arabia is likely to hedge.

³⁰ Sylvia Westall and Angus McDowal, "Former Saudi Spy Chief Says Iran Nuclear Deal Will 'Wreak Havoc,'" *Reuters*, July 16, 2015, <http://www.reuters.com/article/2015/07/16/uk-iran-nuclear-saudi-prince-idUKKCN0PQ0GL20150716>.

³¹ Jeffrey Lewis, "Why Did Saudi Arabia Buy Chinese Missiles?" *Foreign Policy*, January 30, 2014, <http://foreignpolicy.com/2014/01/30/why-did-saudi-arabia-buy-chinese-missiles/>.

II. A MODEL FOR NUCLEAR HEDGING

A. INTRODUCTION

Winston Churchill debated the merits of whether the United Kingdom needed the ability to build atomic weapons.³² Is the capacity to build nuclear weapons enough to hold adversaries at bay, however, or are the weapons required? Ben Frankel points to the insecurity of the anarchic international system as a primary driver for proliferation. In his critique, he recognizes that international regimes, domestic structures, governmental politics, national ethos, technological capability, and the character of leadership are factors affecting nuclear proliferation.³³ Not surprisingly, the same factors that affect nuclear hedging are the same ones behind proliferation: an external threat, domestic conditions, and the effect of international regimes. What changes is the weight that each nation attributes to these factors to produce an acceptable outcome.

Assessing nuclear hedging requires a framework. This thesis uses a framework that merges the observations of Davis, Levite, and Sagan to investigate three critical factors affecting nuclear hedging. These three factors are the threat a nation faces in its calculation for national security, its favorable or unfavorable domestic factors, and the influence of international nuclear regimes. This framework examines each factor in detail to extract observables necessary in analyzing potential hedging nations. The push-pull nature of these factors and decision space wherein national leadership considers hedging are depicted in Figure 1.

³² Levite, “Never Say Never,” 69.

³³ Benjamin Frankel, “The Brooding Shadow,” in *The Proliferation Puzzle: Why Nuclear Weapons Spread and What Results*, ed. Zachary S. Davis and Benjamin Frankel (Portland: Frank Cass, 1993), 37–38.

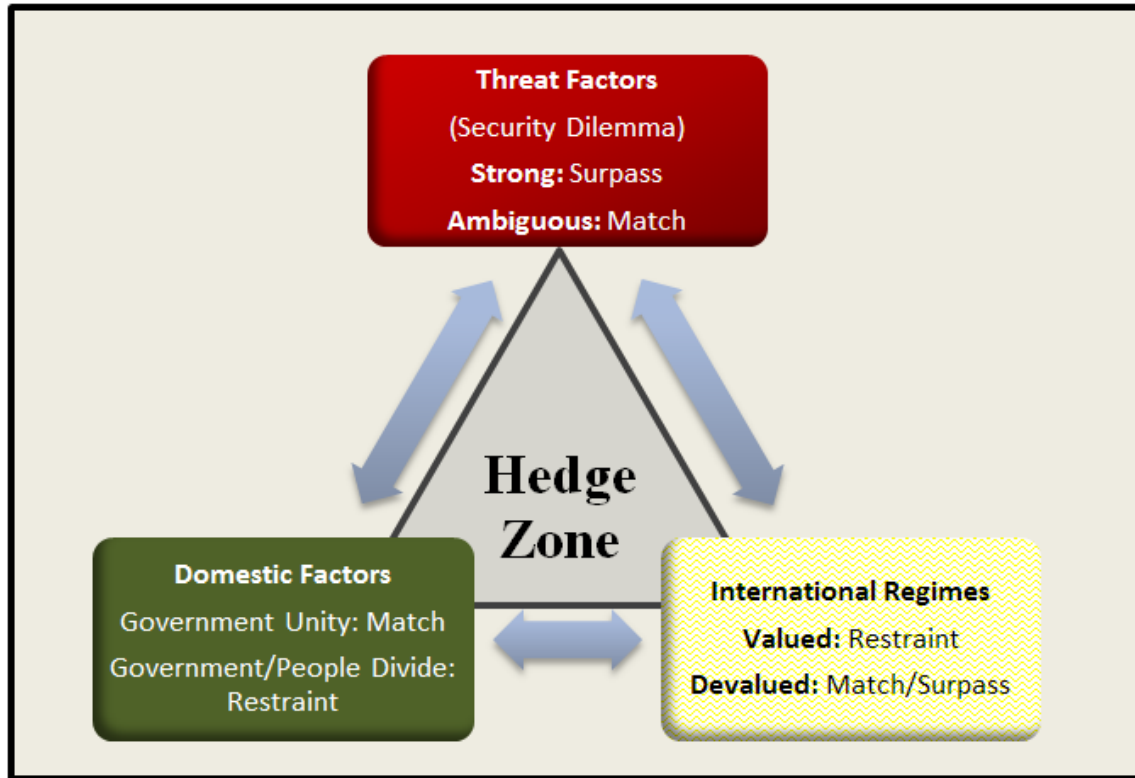


Figure 1. Simple Nuclear Hedging Model

If a threat from a nuclear neighbor or its disproportionately larger army is high and allying with a nuclear nation is unfeasible, the temptation to proliferate rises. On the other hand, domestic factors, such as incongruity between political, military, and scientific communities, may stifle proliferation. International regimes enter the picture to outline for national leadership the consequences of proliferation decisions and the benefits of cooperation. This thesis contends that within the intersection of external threats, domestic concerns, and international nuclear regimes lay the conditions for nuclear hedging (see Figure 1).

B. HEDGING AND NUCLEAR-WEAPON STATES

In 2002, Ariel Levite provided the following definition of nuclear hedging: “A national strategy of maintaining, or appearing to maintain, a viable option for the

relatively rapid acquisition of nuclear weapons, based on an indigenous technical capacity to produce them from several weeks to several years.”³⁴ Nuclear hedging by this definition exists between nuclear restraint, a posture of forgoing nuclear weapons altogether, and acquiring an actual nuclear weapons capability. This section discusses the nuclear-weapon state status from the aspects of significant quantity and nuclear tests as well as explores hedging motivations.

The nuclear weapons status deserves exploration to understand the ends of hedging. The prevalent trend behind assessing defiance of the Treaty on the Non-Proliferation of Nuclear Weapons (NPT) and accusing nations of nuclear breakout, such as in the case of Iran, focuses on a state attaining the ability to produce the amount of fissile material required for an atomic weapon, known as “significant quantity.” The International Atomic Energy Agency (IAEA) defines significant quantity as the thresholds of special nuclear material (SNM) required for a single nuclear weapon.³⁵ The IAEA thresholds are as follows:

- 8 kg of plutonium (containing more than 95 percent of the isotope Pu-239);
- 25 kg of uranium (containing more than 90–95 percent of the isotope U-235); and
- 8 kg of U-233.³⁶

Israeli Prime Minister Benjamin Netanyahu’s famous redline speech at the United Nations General Assembly in 2012 serves as a prime example of the importance placed on the single significant-quantity metric.³⁷ Article II of the NPT clearly articulates that nonnuclear-weapon states neither acquire or produce nuclear weapons nor acquire or

³⁴ Levite, “Never Say Never,” 69.

³⁵ International Atomic Energy Agency (IAEA), *IAEA Safeguards: Aims, Limitations, Achievements* (IAEA/SG/INF/4) (Vienna, Austria: International Atomic Energy Agency, 1983), 26.

³⁶ Ibid.

³⁷ Jeffrey Heller, “Netanyahu Draws ‘Red Line’ on Iran’s Nuclear Program,” *Reuters*, September 12, 2012, <http://www.reuters.com/article/us-un-assembly-israel-iran-idUSBRE88Q0GI20120928>.

accept the means to manufacture them.³⁸ This article presents a security challenge as nations often exchange the nuclear-weapon pursuit for promised access to peaceful nuclear technology, which may ultimately enable a weapons program. The IAEA serves as the watchdog for the treaty with its enforcement of nuclear safeguards. The IAEA's safeguards protocol requires intrusive monitoring of state programs. Should a state refuse access, it risks sending signals of possible violations. In addition, if states deny the IAEA access, national intelligence entities may mobilize to inform the broader international community of possible infractions. Former IAEA Director Mohammed ElBaradei describes a state that achieves significant quantity as a "virtual" nuclear-weapon state that could go nuclear overnight.³⁹ ElBaradei advocates for further restrictions on enrichment and reprocessing capabilities that create these virtual states.⁴⁰ The counter-argument is that states, such as Japan, already possess many significant quantities under articles III and IV of the NPT.⁴¹

Criticism of the significant-quantity method intensified with inspection controversies in North Korea. In this case, concern grew over North Korea's nuclear reactor at Yongbyon that went online in 1986, one year after its accession to the NPT. The reactor could potentially produce six kilograms of plutonium per year.⁴² This event, in conjunction with North Korea's construction of highly explosive nuclear-reprocessing facilities and additional reactors, caused concerns over nuclear breakout.⁴³ The

³⁸ International Atomic Energy Agency (IAEA), *The Treaty on the Nonproliferation of Nuclear Weapons* (INFCIRC/140) (Vienna, Austria: International Atomic Energy Agency, April 1970), 22, <https://www.iaea.org/sites/default/files/publications/documents/infcircs/1970/infcirc140.pdf>.

³⁹ Caterina Dutto, "ElBaradei Remarks at Georgetown University," The Carnegie Endowment, October 24, 2006, <http://carnegieendowment.org/2006/10/24/elbaradei-remarks-at-georgetown-university>.

⁴⁰ Ibid.; Enrichment allows a state to raise the level of U₂₃₅ toward the necessary amount required for nuclear weapons. Reprocessing separates nuclear fuels (such as plutonium) from radioactive waste.

⁴¹ IAEA, *Nonproliferation of Nuclear Weapons*, 22.

⁴² Mary Beth Nikitin, *North Korea's Nuclear Weapons: Technical Issues* (CRS Report No. RL34256) (Washington, DC: Congressional Research Service, 2013), 1, <https://www.fas.org/sgp/crs/nuke/RL34256.pdf>.

⁴³ Ibid.

assessment was that North Korea had enough plutonium for one or two weapons.⁴⁴ In 2006, 20 years after the reactor at Yongbyon went online, the North Koreans tested a nuclear weapon. In subsequent testimony to Congress in 2012, Director of National Intelligence James Clapper referred to North Korea's first test as a "partial failure."⁴⁵ The 2006 North Korean case demonstrates that significant quantities did not translate into a successful nuclear weapons capability. Mastery of the fuel cycle is just one-step toward proliferation.

In a more rigid guideline, a state achieves nuclear-weapon status when it conducts a nuclear test. This was the case with Pakistan in 1998. This method has advantages in its unambiguous nature, but it does not necessarily signal a resounding nuclear capability. North Korea conducted a test in 2006, yet 10 years later, it is still working to miniaturize its nuclear weapons to strike the United States.

Nuclear hedging is an ambiguous area. If a state views hedging as a primary means to security, it may develop infrastructure to get as close as possible to a weapon without actually assembling or testing it. This type of hedging should include the development of delivery means to make a transition as rapidly as possible. Another state may see a nuclear program as a bargaining chip to ensure defensive alliances. In present conditions, a state may not need to develop military applications; just sending the signal of nuclear-weapon exploration may satisfy its security demands. The type of hedging defines the state's approach to capability development and its resulting end state. In either case, nuclear-weapon acquisition is the point at which hedging ends.

Nuclear hedging occurs from the point a nation decides to depart from a position of nuclear restraint to explore the military dimensions of a nuclear program. Conversely, a country departs from a nuclear-hedging strategy with either a publicized nuclear weapons program or the test of a weapon. The secretive nature of nuclear weapons programs creates challenges in discovering a significant quantity while nuclear tests

⁴⁴ Nikitin, *North Korea's Nuclear Weapons*, 1.

⁴⁵ *Ibid.*, 16.

generally represent an intelligence failure. The context of the state's position and its desired end-state are important in identifying nuclear hedging. The next section transitions to the factors behind nuclear hedging using the tenets of modern proliferation theory to construct a model for hedging.

C. A HEDGING MODEL FROM PROLIFERATION MODELS

Scott Sagan offers three distinct models to articulate the cause of proliferation. His first model is the security model, based on the realist premise that security needs drive states to acquire nuclear weapons. Sagan praises the realist approach because its parsimony offers the greatest application in studying past and present proliferation cases.⁴⁶ His domestic-politics model presumes that internal actors in the nation, such as the military and the energy complex, advocate for establishing nuclear programs to advance their interests at the cost of the nation.⁴⁷ Sagan also presents a “normative” model that centers on the prestige of being a nuclear-weapon state or the alternate prestige of nuclear restraint. He uses post–World War II France as an example of a nation that used the symbolism of nuclear weapons to ensure its future relevancy.⁴⁸ Sagan concludes that none of the models he describes can answer the proliferation question unilaterally, and a model that explains a different case approach is necessary for understanding proliferation drivers.⁴⁹ Since nuclear hedging is a subset of proliferation, a similar multi-causal approach is relevant in exploring the interaction between threats, domestic factors, and international regimes.

Zachary Davis articulates a junction of realist and idealist approaches by highlighting the offerings of each. He articulates that power and security issues drive proliferation and that these same factors restrain some states from pursuing nuclear

⁴⁶ Sagan, “Why Do States Build Nuclear Weapons?” 85.

⁴⁷ *Ibid.*, 64.

⁴⁸ *Ibid.*, 78.

⁴⁹ *Ibid.*, 85.

weapons.⁵⁰ Davis further asserts that these realist motivations also empower the neoliberal institutions, such as the United Nations, that have the potential to moderate the underlying reasons for proliferating.⁵¹ This divide between the realist security dilemma and the power of international cooperation through neoliberal institutions provides a decision space in which a state considers nuclear hedging. Domestic factors, such as national resolve and popular support, can either enable or dissuade a government from pursuing a nuclear capability. The degree to which these domestic factors play a part affects the national calculus either to pursue nuclear weapons outright or to set conditions for future acquisition through hedging. In summary, the need for security provides an impetus to acquire weapons; international regimes provide a consequence to that acquisition; and domestic drivers either buttress or contradict the national decision to pursue nuclear weapons and, if pursuit is the outcome, determine the extent of pursuit.

The following sections explore each of these factors in depth to identify indicators of a nation's trajectory toward nuclear proliferation. The intent is to examine the interaction of these factors in the case studies of Pakistan's nuclear pursuit and Japan's nuclear hedging as well as delineate the differences and similarities. After this delineation, the intent is to apply the model to Saudi Arabia as a potential hedging candidate. The following section explores security as the primary factor and uses international-relations theory to explain why states "do what they must."

D. SECURITY FACTORS

State security weighs heavily as a factor in the national decision-making calculus of whether to seek weapons or hedge. The deciding factor might be that the threat to national security outweighs all other benefits of nuclear restraint. At the core of nuclear proliferation is the security dilemma: states have a choice to improve their security position vis-à-vis their threats or outsource their security through alliance.⁵² The

⁵⁰ Davis, "Realist Nuclear Regime," 91–92.

⁵¹ Ibid.

⁵² Sagan, "Why Do States Build Nuclear Weapons?" 57.

persuasive extended-deterrence guarantees of nuclear-weapon states, a prevailing trend throughout the 1960s and '70s, brought states back from the brink of proliferation.⁵³ This section examines threat-based indicators or situations that would cause states to consider nuclear hedging.

John Mearsheimer uses offensive realism to explain state behavior in an anarchic order. He reasons that nations exercise power through the use or production of offensive military capabilities to ensure their survival and hold others at bay because they can never be sure of another state's intentions.⁵⁴ Mearsheimer presents a method of framing power using the concepts of military and latent capability. Military power is a summation of the real military capability a state brings to bear in response to its enemy's force.⁵⁵ More importantly is the concept of latent power, which is the summation of economic, technological, and human resources leveraged to increase military power in a rivalry.⁵⁶ In terms of nuclear hedging, the concept of latent power comes to the forefront. Nuclear hedging is essentially a strategy to convert latent power to military power in a reasonable timeframe respective to the threat.

When comparing latent power, Mearsheimer advocates using the gross national product (GNP) to measure similar countries.⁵⁷ He notes that measuring an agrarian state against a post-industrial nation using this method skews results; therefore, technological and manufacturing capacities deserve consideration in conducting power comparisons.⁵⁸ Spikes in technical investment, such as in manufacturing and energy sectors, are important when considering whether a state is reevaluating its security paradigm against

⁵³ Richard C. Bush, *The U.S. Policy of Extended Deterrence in East Asia: History, Current Views, and Implications* (Arms Control Series, Paper 5) (Washington, DC: Brookings, February 2011), 1, http://www.brookings.edu/~media/research/files/papers/2011/2/arms-control-bush/02_arms_control_bush.pdf.

⁵⁴ Mearsheimer, *Power Politics*, 30–31.

⁵⁵ *Ibid.*, 55.

⁵⁶ *Ibid.*

⁵⁷ Mearsheimer, *Power Politics*, 62.

⁵⁸ *Ibid.*

its rivals. Mimicking gestures bear observation as well; Mearsheimer discusses the concept of imitation in security competition as applied to defensive realism and argues that it applies equally to offensive realism.⁵⁹ Applying this concept, a rival's technological progress may spark imitation in the threatened state. For example, a sudden sharp investment in a nation's nuclear power infrastructure may spark the same in a rival nation. Applied to a potential nuclear rivalry, this interplay may be a graduated process of action and response unless one state attempts a nuclear breakout and forces the other to follow.

Whereas John Mearsheimer focuses solely on the concept of offensive power, Stephen Walt broadly defines threat as the convergence of "aggregate power, proximity, offensive power, and aggressive intentions."⁶⁰ Aggregate power is the culmination of all state resources such as population, natural resources, wealth, and military power.⁶¹ Proximity represents the relationship between the distance from a rival nation and the degree of the threat it presents; a neighboring country presents a far greater threat than a nation half the world away.⁶² Offensive power is the ability to project power to threaten another state within an acceptable risk.⁶³ Walt uses the example of German battleships during World War I to highlight the threat they posed to England's security.⁶⁴ Aggressive intentions are those indicated by an aggressor's history, leader signaling, and offensive posture.⁶⁵

In *The Origins of Alliances*, Walt describes options states may take in response to threatening states. He describes balancing as aligning with another power to offset a security threat posed by another. A security threat that drives balancing may come from a

⁵⁹ Mearsheimer, *Power Politics*, 140.

⁶⁰ Walt, *Origins of Alliances*, 22–25.

⁶¹ Ibid., 23–24.

⁶² Ibid.

⁶³ Ibid., 24.

⁶⁴ Ibid., 24–25.

⁶⁵ Ibid., 25–26.

rising hegemon that, if left unchecked, dominates the region.⁶⁶ Inherent in his hypothesis is the tendency of states to balance with the result that an aggressive state will provoke others to align against it. In the shadow of a nuclear-armed adversary with hegemonic design or delusions of grandeur, states can exercise self-help by pursuing nuclear weapons themselves or balancing with other nations against the threat.⁶⁷ These two approaches are not mutually exclusive. A state may choose to ally itself with a stronger nation while seeking security self-sufficiency. Walt's concept of balancing is important to nuclear hedging because balancing can provide the necessary time to build the means to become self-sufficient. For example, the United States extended its defensive umbrella to South Korea but South Korea began exploring its own program in the 1970s.⁶⁸

The United States has been relatively successful in stopping proliferation among allies through the extension of its nuclear umbrella. It has extended its umbrella to South Korea, Japan, and Europe to provide a balance against would-be aggressors. If alliances extend deterrence and reduce proliferation incentives, failures of these alliances should increase the likelihood of proliferation. Walt explores this phenomenon in his research and finds that countries rally to balance the threat of an aggressive nation even though these alliances are not necessarily bound ideologically.⁶⁹

The question remains how qualitatively to measure the security factors that cause a nation to balance against a nuclear threat. This section has reviewed threat in depth and found the following factors as indicators of threats that favor nuclear proliferation: investment in latent capabilities, aggressive intentions, proximity of rival states that engender imitation, and the devaluation of existing alliances.

⁶⁶ Walt, *Origins of Alliances*, 18.

⁶⁷ Ibid.

⁶⁸ Bush, *Extended Deterrence*, 3.

⁶⁹ Walt, *Origins of Alliances*, 266.

E. DOMESTIC FACTORS

The perspective of supply and demand helps explain the domestic factors that underpin a state's flirtations with nuclear weapons. Domestically, the demand side focuses on why national leadership pushes toward or pulls away from going nuclear. The supply side focuses on proliferation by looking at the material factors necessary to achieve a nuclear-weapon state status. Japan's security dilemma, nuclear ability, and domestic resistance stand in stark contrast with Libya, which had desire but could not produce a nuclear capability indigenously. Demand represents why nations seek weapons. Arguably, the threat factor, as discussed in the previous section, falls within this rubric, but from a domestic perspective, it only drives leaders interested in hedging or reciprocating. This section discusses internal factors that affect the demand side, which includes the type of government and the bureaucratic interaction between a nation's political, bureaucratic, and scientific enterprises.

Arguably, absolute leaders and totalitarian nations can mandate their states to proliferate. Autocratic leader Kim Jung-il put North Korea on a nuclear trajectory that his son readily followed. F.W. de Klerk brought his country back from its existence as an undeclared nuclear state. Though it appears in historical examples that autocratic leaders enable their nations to proliferate, democratic leaders, such as President Charles De Gaulle and Prime Minister Clement Attlee, have also guided their nations toward nuclear arms. If despots were the only ones to pursue nuclear weapons, explaining the Pakistani, Indian, and possibly Israeli nuclear cases would prove difficult. Jessica Weeks dispels the notion that democratic leaders are beholden to popular will in terms of nuclear pursuit as the will of domestic elites holds more substantial weight.⁷⁰ Dong-Joon Jo and Erik Gartzke's statistical analysis corroborates Weeks' work, finding no significant difference between democracies and reclusive states in their predisposition toward acquisition of

⁷⁰ Jessica L. Weeks, "Autocratic Audience Costs: Regime Type and Signaling Resolve," *International Organization* 62 (Winter 2008): 61, doi: 10.1017/S0020818308080028.

nuclear weapons.⁷¹ Christopher Way and Jessica Weeks' subsequent research, in which they isolated and studied personality-based regimes, found that these governments were relatively supportive of nuclear proliferation.⁷² Therefore, proliferation can happen in any type of government structure, and the elites can sway political leadership toward proliferation.

The question remains as to who affects the nuclear proliferation calculus. Various scholars have written about an elite triad of political, scientific, and military-industrial communities who come together to enable a nuclear decision. Peter Lavoy describes a cycle of nuclear "myth making" by elites who emphasize national insecurity or prestige factors to portray nuclear pursuit as the best approach. These actors present the approach in a feasible manner that is consistent with political and cultural beliefs that are acceptable to decision makers in approving nuclear pursuit. The next few paragraphs will discuss why these actors would approve the endeavor or push back on a national decision to proliferate.⁷³

Political concerns can sway a program either way. Politically, it seems logical that investment in proliferation technology produces jobs; the other political intuition is that proliferation invokes the pride of a self-reliant national-defense force. Another view is that if nuclear infrastructure initiates in response to an external threat, such as was the case of the Pakistani response to the Indian test of 1974, it can quash domestic quibbles and serve as a point of unity for government elites.⁷⁴ On the other side of the nuclear equation, the stigma of nuclear weapons hampers the would-be peacemakers and challenges those in power. Monetary costs also compound the complexity of a national decision to create the nuclear apparatus required for weaponry.

⁷¹ Dong-Joon Jo and Erik Gartzke, "Determinants of Nuclear Weapons Proliferation," *Journal of Conflict Resolution* 51, no. 1 (2007):186, doi: 10.1177/0022002706296158.

⁷² Christopher Way and Jessica L. P. Weeks, "Making It Personal: Regime Type and Nuclear Proliferation," *American Journal of Political Science* 58, no. 3 (2014): 716, doi: 10.1111/ajps.12080.

⁷³ Peter Lavoy, "Nuclear Proliferation over the Next Decade: Causes, Warning Signs, and Policy Responses," *Nonproliferation Review* 13, no. 3 (November 2006): 435, doi: 10.1080/10736700601071363.

⁷⁴ Feroz Khan, "Pakistan: Political Transitions and Nuclear Management," Nonproliferation Policy Education Center, February 27, 2012, 11, <http://www.npolicy.org/article.php?aid=1156&rid=6>.

Militaries may refrain from seeking weapons because of the risk associated with the program. The military incurs physical vulnerability if the program exposure occurs before the creation of an initial operational capability. The military may pushback for pure bureaucratic reasons, such as primacy in project leadership or fear that, in a zero-sum environment, pet-projects will suffer budgetary cuts to fund nuclear initiatives. Investment in capacity versus capability can allay these fears and provide a middle ground ripe for nuclear hedging.

The scientific community is a strong force when advocating for investments within its sector. This community sees government spending in its sector as a method to fund further research and infrastructure. The scientific community was the primary advocate for India's decision to test a peaceful nuclear detonation in 1974; the Indian Atomic Energy Commission understated the cost and overstated the benefits to get Prime Minister Indira Gandhi to accede to their development wishes without regard for how it would affect military strategy.⁷⁵ The opposite perspective portends that the scientific community significantly resists a nuclear weapons program because of the pariah effect that comes along with it. Downstream effects can lead to restrictions on imported goods necessary for research, restricted access to educational opportunities, and lost profits for energy laboratories.

These three "demand" communities each have reasons to advocate for or against proliferation, but all three are required for a successful and informed decision to invest in nuclear capacity.⁷⁶ Potential indicators in favor of proliferation are overtures of security from national leaders, such as Hosni Mubarak's statement that though Egypt chooses not to have a bomb, it could have one easily if so desired.⁷⁷ Statements such as this may imply a lower national threshold for considering nuclear weapons. The militarization of energy projects may serve as an indicator. The international community sanctioned the

⁷⁵ Sagan, "Why Do States Build Nuclear Weapons?" 63–64.

⁷⁶ Ibid., 66–67.

⁷⁷ Levite, "Never Say Never," 72.

Iranian Revolutionary Guards Council (IRGC) for being purchasing agents of Iran's atomic enterprise.⁷⁸ Investment in one or all of these sectors in response to an external threat presents potential indicators that merit exploration in the comparative case studies of subsequent chapters.

1. Technological Factors

Several scholars have attempted to nail down what core capabilities must reside in a country to create a nuclear program. One of the first scholars, Stephen Meyers, contends that the latent capability to support an indigenous weapons program emerges from prerequisite industrial, technical, material, and economic resources.⁷⁹ Meyers' original work includes ten key requirements, but Jo and Gartzke's subsequent work pares them to seven core requirements. The seven requirements are as follows: known uranium deposits; a metallurgical industry; chemical engineering; nitric-acid production; a steady electricity-production capacity; nuclear engineers, physicists, and chemists; and specialists in electronics and explosives.⁸⁰ Sagan observes that the overuse of these factors has led to an overstatement of the number of states capable of producing a nuclear weapon.⁸¹ His critique is valid as it considers capability. However, compared to the capabilities required by the process outlined in Figure 2, all factors are still necessary to foster a weapons program and bear consideration when qualitatively assessing a nation's proliferation potential.

The next section discusses the process that produces nuclear fuel to illustrate the enormity of the process and distinguish core requirements that a country must develop to

⁷⁸ Emanuele Ottolenghi, "Exposing the Nutrients: How to Improve Enforcement of Sanctions against Iran," *Foreign Affairs*, October 19, 2010, <https://www.foreignaffairs.com/articles/persian-gulf/2010-10-19/exposing-nutrients>.

⁷⁹ S. M. Meyer, *The Dynamics of Nuclear Proliferation* (Chicago: Chicago University Press, 1984) 41.

⁸⁰ Jo and Gartzke, "Determinants of Nuclear Weapons Proliferation," 173.

⁸¹ Scott D. Sagan, "The Causes of Nuclear Weapons Proliferation," *Annual Review of Political Science* 14 (2011): 230, doi: 10.1146/annurev-polisci-052209-131042.

have a viable hedging option. This process starts with mining uranium from the ground and ends short of weapon assembly.

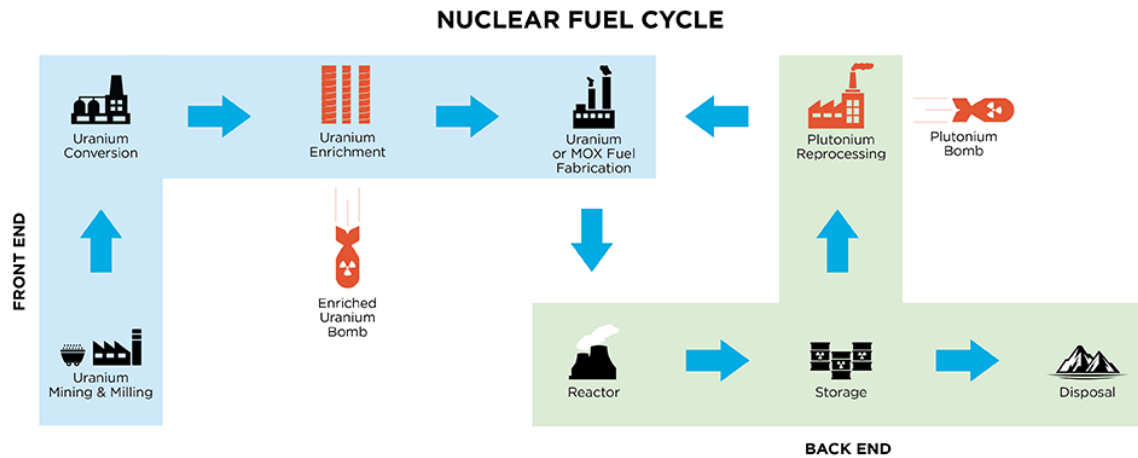


Figure 2. Nuclear Fuel Cycle⁸²

Mining and milling uranium, though not much different from processing common metals, requires a metallurgist to guide the process and separate the uranium from undesired ores and material mined in the process. Natural uranium, U^{238} , comes out of the ground with trace amounts of U^{235} , the fissionable isotope of uranium. This process requires an intensive amount of U^{238} to ensure that there is enough U^{235} available in the ore to enrich it to the suitable level. The ore leaves the milling and mining process as U_3O_8 , better known as yellowcake. Investment in or diversion of indigenous mining to surveyed areas of uranium pockets could provide a useful indicator of a burgeoning state nuclear program.

Today, the gold standard for enrichment uses centrifuge plants for separation. All of these processes require access to a large amount of steady and stable power. Another potential indicator would be an upgrade to existing or the construction of new power infrastructure. This process validates Meyer's supposition that access to steady power is

⁸² Source: "Module 1: Overview: What is The Nuclear Fuel Cycle?" Nuclear Threat Initiative, accessed June 18, 2016, <http://tutorials.nti.org/nuclear-101/overview/>.

necessary. Depending on the level of enrichment capability, the state chooses whether to enrich the uranium for a weapon or to use the low-enriched uranium to produce reactor fuel rods necessary for plutonium. If the state desires plutonium, the fuel rods undergo irradiation in a reactor, and the “spent” rods are pulled and reprocessed for the residual plutonium. The key observable is a capable reactor and the personnel to run it. It is generally at this point in the process that the concern of significant quantity draws the attention of the IAEA, which only intensifies when NPT safeguards are found lacking.

At this point, both processes have produced fissile oxide materials. These oxides are turned into metals that require fabrication and machining to use in a nuclear design. The process described to this point is an oversimplification of the process, and the cost and technical acumen required to produce a nuclear product is immense. For example, if a nation desires a weapons program, engineers must design the means for delivery.

Although Sagan challenges Meyers as well as Jo and Gartzke for falsely predicting high levels of latent capability in places like Trinidad and Tobago, their factors remain useful in providing qualitative indicators of nuclear activity.⁸³ Sagan pushes for multi-causality in his research, but operationalizing these factors to determine latent nuclear capabilities is just one way to analyze the problem set. Categorized in the core areas of personnel, material, and infrastructure, the indicators paint a potential proliferation picture. For example, Iran begins a clandestine interest in centrifuge technology in the 1980s, initiates a uranium-mining program, sends students abroad to study the nuclear-related scientific disciplines, starts developing ballistic missiles, constructs underground scientific facilities, and begins to upgrade infrastructure. Each factor on its own caused limited concern, but cumulatively, these factors increased concern among the international community, reaching its crescendo when Ahmadinejad

⁸³ Sagan, “The Causes of Nuclear Weapons Proliferation,” 229–230.

had achieved enough technological progress that he could make a credible threat against Israel.⁸⁴

2. Economic Factors

Economics play a role as either the carrot or the stick of international nonproliferation regimes. Internationally, economic concerns represent an aspect of power in the projection of influence in the forms of trade or sanctions. Bruce Russett and John Oneil discuss the peaceful effects of economic interdependence. They assert that the drumbeats of war mobilize industrial leaders to apply pressure on political elites.⁸⁵ This leads to two effects: hawks within the military-related industries can provide incentives while industry captains who stand to lose can provide incentives for peace.⁸⁶

Nations use economics to pressure proliferation decisions. Most recently, the effect of sanctions has arguably brought Iran to the collective bargaining table. A premise of the JCPOA is that the reintegration of Iran into the world market will create conditions that force Iranian leadership to realize that the economic benefits outweigh the perceived nuclear-weapons costs. The JCPOA is a positive incentive that essentially operationalizes the old guns-versus-butter debate.

The Pressler Amendment is an example of an effort by the United States to discourage Pakistani proliferation through negative economic incentives. It linked continued U.S. foreign aid with annual executive certification that Pakistan had not developed nuclear weapons. The complicating factor in this effort was in the strategic backdrop against in which it was employed. Unfortunately, Pakistan's varying strategic importance created discontinuity in the U.S. political approach. The Soviet–Afghan war placed significant weight on Pakistan as a power-projection platform through which the

⁸⁴ Louis Charbonneau, "In New York, Defiant Ahmadinejad Says Israel Will Be 'Eliminated,'" *Reuters*, September 24, 2012, <http://www.reuters.com/article/us-un-assembly-ahmadinejad-idUSBRE88N0HF20120924>.

⁸⁵ Bruce M. Russett and John R. Oneal, *Triangulating Peace: Democracy, Interdependence, and International Organizations* (New York: Norton, 2001), 154.

⁸⁶ *Ibid.*, 130.

CIA needed to funnel weapons to the mujahedeen. President H.W. Bush refused to certify Pakistan, triggering the cutoff of economic and military aid.⁸⁷ Pakistan felt the effects of the Pressler Amendment, and the United States found that economic and military aid was not sweet enough to entice the Pakistanis from forgoing their weapons.

The fiscal reality of building nuclear infrastructure is prohibitive, even for wealthy nations. The Saudis plan to spend \$80 billion to build 16 nuclear reactors.⁸⁸ Such programs come at the expense of domestic initiatives and international business. Economic conditions can incentivize politicians to keep programs from crossing proliferation thresholds if the economic costs outweigh the security benefits. Chapter IV seeks to explore this interaction in the case of Japan.

F. INTERNATIONAL REGIMES

International regimes are effective at providing barriers to nuclear proliferation in the sense that they are the sum of all efforts to achieve that outcome.⁸⁹ Today's efforts include a variety of regimes: the Treaty for the Nonproliferation of Nuclear Weapons (NPT) and the Nuclear Suppliers Group (NSG), and, to a lesser extent, the Missile Technology Control Regime (MTCR), the IAEA, the Additional Protocol, the United Nations Security Resolution 1540, the Proliferation Security Initiative, and other multilateral agreements. This section explores each effort and its contribution to nonproliferation efforts.

At the forefront of the nonproliferation regime is the NPT. Its permanent renewal in 1995, emulation in other treaties, and widespread ratification serve as proof of its lasting efficacy. To this day, only India, Israel, Pakistan, and South Sudan have not signed the treaty. The first three have known and suspected nuclear weapons programs, and the latter is presumably too new to statehood to have signed the treaty. The key

⁸⁷ C. Christine Fair, "The U.S.-Pakistan F-16 Fiasco," *Foreign Policy*, February 3, 2011, <http://foreignpolicy.com/2011/02/03/the-u-s-pakistan-f-16-fiasco/>.

⁸⁸ "Nuclear Power in Saudi Arabia," World Nuclear Association, accessed August 23, 2016, <http://www.world-nuclear.org/information-library/country-profiles/countries-o-s/saudi-arabia.aspx>.

⁸⁹ Davis, "Realist Nuclear Regime," 86.

operational concept of the NPT is that the treaty marries the liberal tradition of cooperation among states with the realist premise of security. The basic bargain is access to the benefits of peaceful nuclear energy for renouncing nuclear weapons and accepting compliance monitoring. The benefit of being a nonnuclear-weapon state stems from the influx of nuclear technology and the many incentives for not spending money on nuclear weapons in a competitive security environment. The benefit to a nuclear-weapon state is reduced competition in an anarchic order.

The International Atomic Energy Agency (IAEA), the established watchdog, monitors NPT compliance. The IAEA conducts onsite visits to ensure that nuclear materials are not diverted to nefarious weapons programs. The organization identifies safeguard problems for correction and reports compliance failure to the United Nations Security Council. The enforcement mechanism is the combined influence of political, economic, and military powers. When prolonged failure to comply with the norms of the NPT raises questions about a country's nuclear efforts, an alliance of nations reacts to bring the state back into compliance. The current efforts of the Joint Comprehensive Program of Action represent the initiative to bring Iran back into the fold while North Korea's obstinacy has relegated it to the status of a hermit kingdom. In this way, international cooperation and multilateral alliances reinforce the nonproliferation norm.

A consortium of nuclear nations established the Nuclear Suppliers Group (NSG) in the wake of the 1974 peaceful nuclear explosion by India.⁹⁰ These nations responded to the potential of states to divert nuclear and dual-use technologies to nefarious nuclear activities. The result was a constantly growing list of technologies that are designated as restricted trade items that require special licensing to transfer them to another nation. The group has established a "trigger list" of nuclear materials, equipment, software, and dual-use technologies subject to NSG restrictions.

⁹⁰ "About the NSG," Nuclear Suppliers Group, accessed September 6, 2016, <http://www.nuclearsuppliersgroup.org/en/about-us>.

The Missile Technology Control Regime (MTCR) represents another attempt to limit the spread of weapons of mass destruction by restricting imports and exports of delivery-system technology. It represents a voluntary coalition of 34 nations seeking to limit the illicit acquisition of technologies on its designated trigger list of critical items used to produce missiles. Those who join the group and agree to its rules also receive privileged access to the items on the list. The coalition includes Russia and the United States but, conveniently, not China.⁹¹

One of the critiques of the NPT and its associated efforts is that it creates a system of haves and have-nots. Nuclear-weapon states have agreed in Article 6 of the NPT to move toward nuclear disarmament. However, the slow progress to date breeds contempt by nonnuclear-weapon states. President Obama attempted to ease those concerns in his Prague speech and other policies—with little progress to show for his efforts.

Participation in these regimes does not indicate accession to the nonproliferation norms. North Korea withdrew from the NPT before it fully acceded to its provisions, not to mention Iraq and Iran worked on nuclear weapons while proclaiming to be upstanding members. This thesis contends that the true value in these regimes resides in the ability to force states to reconsider nuclear intentions in light of international sanctions. A state's level of participation in such regimes or perhaps a change in behavior toward them may serve as hedging indicators.

G. CONCLUSION

The previous sections have discussed the factors of threats, domestic factors, and international regimes to evaluate possible hedging nations. As depicted in Figure 3, the degree to which these factors interact influences whether a state will hedge. The space in which nuclear hedging occurs is approximate and bears qualitative review of past proliferation cases to determine how these factors interact. This thesis contends that the nexus of threats and favorable domestic conditions encourage proliferation, but the

⁹¹ "MTCR Partners," Missile Technology Control Regime, accessed September 6, 2016, <http://www.mtc.info/english/partners.html>.

layering of international regimes forces a nation to rethink its nuclear proliferation strategies. This nexus of factors creates an environment favorable to nuclear hedging (see Figure 3). On the left, security imperatives drive nations toward nuclear pursuit. On the right, internal supply and demand factors either enable or dissuade nuclear aspirations. The middle depicts the role of international regimes in a state contemplating a transition from nuclear restraint to nuclear pursuit. The following chapters analyze the cases of Japan and Pakistan to populate the construct. The intent is to identify commonalities and differences useful in application to Saudi Arabia.

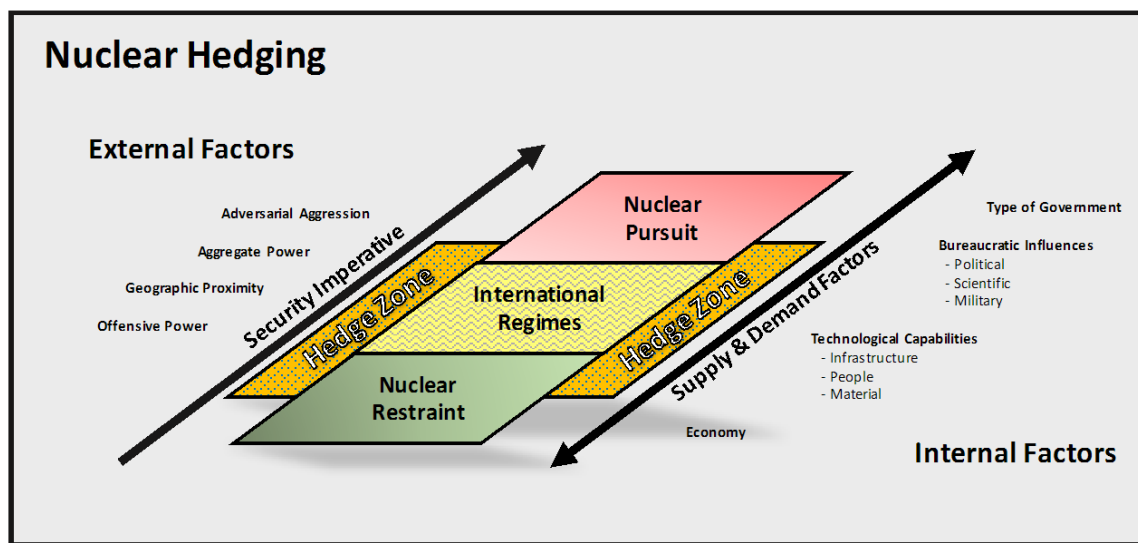


Figure 3. Nuclear Hedging Factors

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III. PAKISTAN CASE STUDY: MORE THAN A HEDGE

“The answer to an atom bomb can only be an atom bomb.”⁹²

—Zulfiqar Ali Bhutto

A. INTRODUCTION

Pakistan represents one of the best-documented cases of nuclear proliferation. Feroz Khan describes a country that started exploring nuclear weapons in 1971 and transitioned to nuclear pursuit three years later.⁹³ It was in 1974 that the factors of an external threat, favorable domestic actors, and emerging nonproliferation regimes collided to push Pakistan toward seeking nuclear weapons under the guise of peaceful nuclear pursuits. The Pakistan case study represents a nation pushed past its limits of restraint toward a decision to obtain the bomb. The critique from the standpoint of hedging is that Pakistan went from nuclear restraint to nuclear capability while feigning satisfaction with hedging to ensure foreign aid. If nuclear hedging is the gray space between restraint and rapidly pursuing the capacity to produce nuclear weapons, the Pakistani case illuminates the transition between developing the capacity in 1971 to pursuing production capability in 1974. Pakistan serves as an example of a state that chose to move hurriedly from nuclear restraint to nuclear proliferation without pursuing a reasonable hedging strategy. The decisions Pakistan made—in response to India, the role that alliances or the lack thereof played, and its industrial development—establishes a baseline proliferation case to contrast Japan, a true hedging case. The following sections use the analytical construct introduced in Chapter II to investigate the case of Pakistan. These sections discuss the history of the Pakistani nuclear program and evaluate it from the perspective of threats, domestic concerns, and the influence of regimes.

⁹² Kausar Niazi, *Last Days of Premier Bhutto* (Lahore: Jang, 1991), 85.

⁹³ F. Khan, *Eating Grass*.

B. HISTORY

To understand Pakistan is to appreciate the circumstances of its national emergence. The liberation of India from British rule gave birth to Pakistan in 1947. British Prime Minister Attlee realized that retaining India under British dominion was no longer feasible. Amidst growing religious violence in the region, he dispatched Lord Louis Mountbatten to oversee the eventual emancipation of India. As Viceroy, Mountbatten negotiated a settlement between fighting Hindu and Muslim factions by dividing the country. To demarcate the partition, Mountbatten employed Judge Cyril Radcliffe to redraw the maps that created Pakistan and India, a task that took him just 40 days. The result was the birth of Pakistan, a nation that had geographic masses segregated by a jut of India one thousand miles wide. With the partition instituted, millions of Muslims migrated to Pakistan, and Hindus were displaced to India. This transition was as violent and bitter as the debates leading up to it. Accounts of “ghost trains” arriving at train stations with every occupant of the train butchered were common.⁹⁴ The violence attributed to the mass migration of this era led to over a million deaths and left the collective psyche of both nations seared with an obsessive hatred toward one another.

C. PAKISTAN’S SECURITY IMPERATIVE

The Indo–Pakistani standoff dominates South-Asia’s security paradigm. Three wars before the Indo–Pakistani nuclear era cemented the acrimonious relationship embodied by Pakistan and India today. India and Pakistan fought over the Kashmir region in the Indo–Pakistani war of 1947. The war concluded under a United Nations (UN) resolution that left the territory of Kashmir divided. The second war was the Indo–Pakistani war of 1965 that ended with a UN sanction and both countries subject to an arms embargo because of the hostilities.⁹⁵ The Indo–Pakistani conflict of 1971 was the third war. In this conflict, Pakistan suffered a humiliating defeat to India, lost the territory

⁹⁴ Maajid Nawaz, *Radical: My Journey out of Islamist Extremism* (Guilford, CT: Lyons Press, 2013), 5.

⁹⁵ “The India–Pakistan War of 1965,” United States (U.S.) Department of State, accessed September 6, 2016, <https://history.state.gov/milestones/1961-1968/india-pakistan-war>.

of East Pakistan, and saw 93,000 soldiers taken as prisoners of war.⁹⁶ Pakistan recognized that it could not compete head-to-head with India in terms of aggregate power and needed a counterbalance to create military parity with India.

In terms of latent power, Pakistan remained at a deficit with India. India was the sole beneficiary of the economic and military trappings of the British departure; India inherited a standing government while Pakistan had to establish a government and an economy from scratch. The relative disparity between the latent and military capabilities of India and Pakistan in 1971 is shown in Table 1. These relative proportions remain today.

Table 1. Pakistani and Indian Latent and Military Strength Figures in 1971⁹⁷

Latent Strength	<u>India</u>	<u>Pakistan</u>	<u>+/- Diff</u>
Population	557,000,000	126,300,000	77.3%
GNP	\$49 Billion	\$16 Billion	67.3%

Military Strength	<u>India</u>	<u>Pakistan</u>	<u>+/- Diff</u>
Manpower	980,000	392,000	60%
Tanks	1450	870	40%
Aircraft	625	285	54.4%

China's nuclear test in 1964 spurred India to develop nuclear infrastructure as part of its national identity. Indian Admiral Krishan Nayyar stated, "The world has learned to live with U.S. power, Soviet power, even Chinese power, and it will have to learn to live with Indian power."⁹⁸ This statement captures the essence of Indian nationalism, and this aspect of its culture is alive and well in India's nuclear program today.⁹⁹ When the

⁹⁶ Zulfikar Ali Bhutto, "Pakistan Builds Anew," *Foreign Affairs* 51, no. 3 (1973): 541.

⁹⁷ International Institute for Strategic Studies, "Asia and Australasia," *The Military Balance* 71, no.1 (1971): 46–47, 50, doi: 10.1080/04597227108459811.

⁹⁸ Ayesha Siddiqa-Agha, *Pakistan's Arms Procurement and Military Buildup, 1979–99* (New York: Palgrave, 2001) 17.

⁹⁹ Ashok Kapur, *Pakistan's Nuclear Development* (London: Croom Helm, 1987), 44.

Indians began reprocessing plutonium at the Trombay plant in 1964, this activity brought a debate about nuclear weapons to the forefront of Pakistani politics.¹⁰⁰ Initially, President Ayub Khan thought that Pakistan could not afford to pursue nuclear weapons but could just buy them should the need arise.¹⁰¹ Only after Pakistan's devastating loss in 1971 did opinions lean toward acquiring a nuclear counterweight to the Indian threat.

Pakistan's history and precarious security situation from the very outset provided ample justification for pursuing nuclear weapons.

D. ALLIANCES AS AN OFFSET TO INDEPENDENT ACTION

Early in its nationhood, the Pakistanis sought to offset their diminished security position with India through balancing. Pakistan sought to develop alliances and agreements, predominantly with the United States, to counter India's superior power. The first agreement was the Mutual Defense Assistance Agreement of 1954. Soon after entering into the agreement, Pakistan suspected India of making side deals with the United States to undercut the alliance.¹⁰² The same year, Pakistan joined the Southeast Asia Treaty Organization (SEATO), and in 1955, Pakistan became a member of the Central Treaty Organization (CENTO).¹⁰³ These Cold-War security arrangements were part of America's broader containment strategy aimed at countering Soviet expansionism. Pakistan's location on Moscow's southern flank provided key positions for U.S. military installations, bases to house U2 spy planes. Pakistan quickly became the "most aligned ally" among U.S. allies due to its geopolitical importance. However, the alliance between

¹⁰⁰ "Plutonium Reprocessing Plant," Nuclear Threat Initiative, accessed June 7 2016, <http://www.nti.org/learn/facilities/858/>; F. Khan, *Eating Grass*, 61–62; Adrian Levy and Cathy Scott-Clark, *Deception: Pakistan, the United States and the Secret Trade in Nuclear Weapons* (New York: Walker, 2007), 61.

¹⁰¹ Kapur, *Pakistan's Nuclear Development*, 44.

¹⁰² Mohammed Ayub Khan, "The Pakistan–American Alliance," *Foreign Affairs*, January 1964, <https://www.foreignaffairs.com/articles/asia/1964-01-01/pakistan-american-alliance>.

¹⁰³ "The Baghdad Pact (1955) and the Central Treaty Organization (CENTO)," U.S. Department of State, accessed September 6, 2016, <https://history.state.gov/milestones/1953-1960/cento>.

Pakistan and the United States did not last. Three key events caused the alliance to deteriorate and established a trend of distrust that has defined the relationship.

First, the United States and the United Kingdom's provision of arms to India in the Sino-Indian War of 1962 as part of their efforts to curb communist expansion undermined the relationship with Pakistan.¹⁰⁴ Pakistan felt that the United States should have consulted it before arming its neighboring enemy.¹⁰⁵ At a minimum, Pakistan's leaders wanted a guarantee that India would not turn the U.S.- and U.K.-supplied arms against them.¹⁰⁶ The United States justified their actions as stopping the expansion of communism, which was the same basis for its alliance with Pakistan.¹⁰⁷ This event represented an early sign that, when pushed, Pakistan's security perceptions would always prevail over U.S. interests.

Second, the U.S.-U.K. arms embargo imposed after the 1965 Indo-Pakistani conflict slighted the Pakistanis. Although the arms embargo applied equally to both sides of the conflict, the Pakistanis felt that the effects hurt them disproportionately. Their reasoning was that the arms embargo reinforced India's advantage and left them even more vulnerable. The embargo forced Pakistan to look elsewhere for aid, and they found a new friend in China, which not only had experience living under arms embargoes but also was willing to provide broad assistance to help Pakistan deal with India. With its own interests at stake in South Asia, Beijing offered considerable advice. This included telling Prime Minister Bhutto to bide his time and avoid provoking India until Pakistan was stronger.¹⁰⁸ The Chinese educated the Pakistanis in reverse-engineering foreign-

¹⁰⁴ Robert J. McMahon, *The Cold War on the Periphery: The United States, India, and Pakistan* (New York: Columbia University Press, 1994), 298.

¹⁰⁵ U.S. Department of State, "195: Telegram from the Department of State to the Embassy in Pakistan," in *South Asia*, Foreign Relations of the United States, 1961-1963, ed. the Historical Office, vol. XIX (Washington, DC: Government Printing Office, 1996), <https://history.state.gov/historicaldocuments/frus1961-63v19/d195>.

¹⁰⁶ Ibid.

¹⁰⁷ McMahon, *Cold War on the Periphery*, 294

¹⁰⁸ F. Khan, *Eating Grass*, 48.

defense technology, a trade they had mastered after their nation faced sanctions for nuclear weapons testing.¹⁰⁹

Third, Pakistan's allies failed to come to its aid in the 1971 Indo-Pakistani conflict. When civil war broke out in East Pakistan, the United States tried to keep pressure off Pakistan by characterizing the uprising as an internal state matter.¹¹⁰ However, Indira Gandhi pressured the international community for intervention, citing the genocidal actions of the Pakistani military and the flow of refugees into her country as a call for action. India threatened unilateral action, but it was not until a preemptive attack by the Pakistani Air force on six Indian airbases that India took action. Henry Kissinger had tried to exert pressure on India by requesting Chinese mobilization on the eastern front while the United States moved carrier groups to the Bay of Bengal.¹¹¹ This move notoriously backfired by insulting both India and Pakistan with the implied but empty threat to intervene. In August 1971, the Indians signed the Indo-Soviet Treaty of Peace, Friendship, and Co-operation with Moscow, deepening Pakistan's insecurity.

Pakistan's security needs remained unfulfilled by its alliances. In essence, SEATO was founded as a bulwark against communist expansionism when Pakistan truly needed an offset to India. Stung by the humiliating defeat and the loss of its eastern province, the Pakistanis felt their commitment to SEATO was unreciprocated in light of the U.S./U.K. arms embargo of 1965 and the lack of assistance in 1971. Pakistan formally left SEATO in 1973.¹¹² The end of the alliance, however, did not end the relationship between the United States and Pakistan. The United States still provided much-needed economic and military aid and leveraged it over the next several years to

¹⁰⁹ Jonah Blank, "Pakistan and China's Almost Alliance," Rand, accessed July 13, 2016, <http://www.rand.org/blog/2015/10/pakistan-and-chinas-almost-alliance.html>.

¹¹⁰ U.S. Department of State, *South Asia Crisis*, Foreign Relations of the United States, 1969–1976, ed. the Historical Office, vol. XI (Washington, DC: Government Printing Office, 1971), <http://2001-2009.state.gov/r/pa/ho/frus/nixon/xi/45604.htm>.

¹¹¹ "The South Asia Crisis and the Founding of Bangladesh, 1971," U.S. Department of State, accessed September 6, 2016, <https://history.state.gov/milestones/1969-1976/south-asia>.

¹¹² "Southeast Asia Treaty Organization (SEATO), 1954," U.S. Department of State, accessed May 14, 2016, <https://history.state.gov/milestones/1953-1960/seato>.

discourage the Pakistanis from pursuing nuclear weapons in response to Indian overtures. The defeat in 1971 instilled a national “never again” mentality among the Pakistanis.¹¹³ Prime Minister Bhutto began to explore the nuclear-weapon option as a national guarantor of security in 1971 and followed up with a major push to acquire nuclear weapons in 1972 at Multan. Alliances failed to meet Pakistan’s security needs, driving Pakistan to seek the security afforded by nuclear weapons.

E. DOMESTIC FACTORS

A nation must bring its scientific, military, and political institutions into harmony to establish a credible nuclear weapons program. Politicians supplied the necessary economic and bureaucratic support, the scientific community provided the means to build a nuclear explosive package, and the military enabled its use. In Pakistan, the man responsible for this synchronization was Prime Minister Zulfikar Ali Bhutto. His rise to power and early experiences paint the background for Pakistan’s nuclear decision. Once Bhutto decided to establish a nuclear capability, his successors continued his work as a point of national resolve. This section explores the role Prime Minister Bhutto played in putting Pakistan on the nuclear path.

Zulfikar Ali Bhutto served as the foreign minister under President Ayub Khan. Bhutto was an astute politician known for having a political hedge strategy of “one foot inside the establishment and one outside” during Khan’s administration.¹¹⁴ Discussion of nuclear weapons first emerged in 1965 because of Indian nuclear reprocessing, and such debate led to the formation of pro- and anti-bomb lobbies.¹¹⁵ Bhutto and his foreign ministry were at the forefront of the bomb lobby. Their core arguments were as follows:

1. The security landscape in South Asia changed with the Chinese nuclear test.
2. Pakistan could not rely on ally support for security.

¹¹³ F. Khan, *Eating Grass*, 70.

¹¹⁴ Ashok Kapur, *Pakistan in Crisis* (London: Routledge, 2006), 110–11.

¹¹⁵ Kapur, *Pakistan’s Nuclear Development*, 77.

3. The window of opportunity was closing with the advent of the NPT.
4. The disparity between Pakistani and Indian strength would be unbridgeable should India acquire a bomb.
5. The establishment of a nuclear program would require growth in the scientific community and the downstream effect would enable Pakistan to become a technologically progressive nation.¹¹⁶

Bhutto used these arguments to push for elements of a nuclear program piecemeal. Bhutto used surrogates, such as Munir Khan, to promote a nuclear weapons program that President Khan had rejected on cost factors.¹¹⁷ Bhutto's consistent calls for action, to include his advocacy for war in 1965, drew the disdain of President Khan, and in 1966, Bhutto was asked to resign for medical reasons.¹¹⁸

In the aftermath of the 1971 war, Bhutto rose to power as the Pakistani head of state under martial law. Once in power, his first order of business was the exploration of nuclear weapons. At the Multan conference, Bhutto announced he was replacing Ishrat Usmani with Munir Khan for director of the Pakistani Atomic Energy Commission (PAEC). This action had two effects. First, it supplanted Usmani, who had opposed Bhutto in his pursuit for a bomb.¹¹⁹ Second, it rewarded the loyalty of Munir Khan.¹²⁰ In the contracting dispute, Bhutto had hoped to steer the deal toward a local construction company, but Usmani insisted that only a foreign company could maintain the quality.¹²¹ Munir Khan, who was working at the International Atomic Energy Agency, promptly

¹¹⁶ F. Khan, *Eating Grass*, 61.

¹¹⁷ Munir Ahmad Khan, Chagai Medal Award Ceremony (speech, Pakistan Institute of Nuclear Science and Technology in Islamabad, March 20, 1999), <http://www.nuclearfiles.org/menu/key-issues/nuclear-weapons/issues/policy/pakistani-nuclear-policy/munir%20ahmad%20khan's%20speech.html>.

¹¹⁸ Anwar H. Syed, *The Discourse and Politics of Zulifkar Ali Bhutto* (London: Macmillan Press, 1992), 59.

¹¹⁹ Mansoor Ahmed, "Pakistan's Nuclear Odyssey: An Organization and Bureaucratic-Politics Perspective," in *Organizational Cultures and the Management of Nuclear Technology*, ed. Karthika Sasikumar (London: Transaction, 2012), 65.

¹²⁰ F. Khan, *Eating Grass*, 89.

¹²¹ Kapur, *Pakistan's Nuclear Development*, 54–55.

resigned from his position and accepted the position of director of the PAEC. This conference shifted favor to the pro-bomb community, and exploration ensued.

The military was initially apathetic about nuclear weapons; their interests lay in the modernization and equipping of their respective services. It was not until a routine Pakistani interagency brief to the Army's General Headquarters by PAEC Director Usmani that the Army considered the idea of nuclear weapons. In 1967, Usmani presented a nuclear fuel-cycle brief that clearly went over the heads of the military officers in the room until he highlighted the point at which a nuclear weapons program starts.¹²² This was the "eureka" moment for the Pakistani military's interest in nuclear weapons. As arms embargoes and sanctions continued to limit the ability to modernize and equip its forces, the military's impetus for weapons only increased.

For Bhutto to capitalize on his successes of providing purpose to the scientific community and bringing the military aboard, he needed to align the government with his policy. Aligning the government was instrumental in securing funding, resources, and labor. Once he received research plans for enriching uranium and producing plutonium, President Bhutto made the PAEC a direct-reporting entity and directed the finance minister to supply all the funds necessary.¹²³

History credits Prime Minister Bhutto as the father of the Pakistani bomb. He was arguably the right man at the right place, at the right time, and with the right idea when threats and domestic factors converged. The arguments of his pro-bomb lobby resonated among a population reeling from defeat. Subsequent government validation of his proposed nuclear program allowed a continuous national focus toward security independence.

¹²² F. Khan, *Eating Grass*, 80.

¹²³ M. A. Khan, Chagai speech.

1. Technological Barriers and National Will

In 1971, Pakistan was in tatters, its economy dependent on foreign aid. The odds that it could pull together the scientific expertise and the finances to master the nuclear fuel-cycle seemed like a longshot. Yet Pakistan mobilized patriotism to bring back the necessary scientists and further mobilized Islamic identity among Middle Eastern nations, such as Iran, Libya, and Saudi Arabia, to help finance the effort.¹²⁴ This section examines Pakistan's nuclear development in terms of personnel, material, infrastructure, and delivery development.

In the 1950s, Pakistan jump-started its energy program through the Atoms for Peace program, and energy independence became a realizable dream. Nazhir Ahmad led a peaceful yet stumbling program that lacked any inkling of military application or motivation and did not fulfill a military-political necessity.¹²⁵ Ishrat Usmani took the reins in 1960 and envisioned making Pakistani nuclear energy a reality. During this time, Pakistan experienced substantial economic growth, and Usmani rallied political support from Zulfikar Bhutto, then foreign minister, and Abdus Salam to garner the necessary intergovernmental support for a nuclear power program.¹²⁶ During this early period, Pakistan's nuclear program lacked any weapons application, focusing solely on energy development. Usmani developed relationships among his organization and the academic and political bases. This process started to build Pakistani's nuclear intellectual capacity should a change of course occur in the future.

In Prime Minister Bhutto's authorization for the PAEC to advance toward nuclear fuel-cycle development, he charged the program with a nationalistic, anti-Indian objective. He brought back scientists from abroad to participate in the Pakistani endeavor for less pay by appealing to their patriotism. Two of the more prominent scientists were Munir Khan and Abdul Qadeer "A. Q." Khan. Pakistan did not undertake this endeavor

¹²⁴ Levy and Scott-Clark, *Deception*, 20.

¹²⁵ Kapur, *Pakistan's Nuclear Development*, 49.

¹²⁶ F. Khan, *Eating Grass*, 51.

with an empty cupboard in terms of nuclear scientists; Usmani's work built a cadre of multi-disciplined scientists for the program to advance.

The next question of the proliferation puzzle was how to bring more reactors into Pakistan to build the nuclear infrastructure. The advent of the NPT and the Indian nuclear test of 1974 put Pakistan's motivations into question. Pakistan's approach was to accept foreign technology with IAEA safeguards but seek a clause to reproduce or reverse-engineer domestically any equipment or infrastructure provided. This allowed for a parallel development track that facilitated imports of foreign technology while bypassing the IAEA's nuclear safeguards. Soon thereafter, countries grew uncomfortable, and deals fell through. The Canadians refused to provide support for the Karachi Nuclear Power Plant (KANUPP)'s reactor without Pakistan agreeing to stringent safeguards.¹²⁷

Chinese assistance was paramount to Pakistan's nuclear success. As a non-signatory to the NPT, the Pakistanis found it difficult to acquire the items they needed to succeed. Chinese assistance enabled the Pakistani nuclear program to leapfrog difficult technological barriers. The Chinese provided over the course of Pakistan's nuclear endeavor the plans to the CHIC-4 nuclear explosive package, 50 kilograms of highly enriched uranium, and 15 tons of UF₆.¹²⁸ In addition, the Chinese, who were living under their own set of sanctions since their test in 1964, offered to help reverse-engineer Western technologies to which they had not had access. The Chinese went as far as dispatching a team to KANUPP to begin the reverse-engineering process.¹²⁹

As the Pakistanis were debating nuclear exploration, a young Pakistani scientist named A. Q. Khan was working with centrifuges at the Uranium Enrichment Consortium (URENCO) in the Netherlands. Stunned by the bitter defeat in 1971, Khan felt obliged to offer his services to his homeland. Khan wrote to Prime Minister Bhutto asking to assist

¹²⁷ John R. Walker, "U.S. Follows Canada's Line," *Ottawa Citizen*, February 17, 1977, <https://news.google.com/newspapers?nid=2194&dat=19770217&id=4b0yAAAAIBAJ&sjid=wu0FAAAAI BAJ&pg=884,3197786&hl=en>.

¹²⁸ Anwar Iqbal, "Pakistan Assails U.S. Report about Chinese Help for N-Plan," *Dawn*, November 14, 2009, <http://www.dawn.com/news/911102/pakistan-assails-us-report-about-chinese-help-for-n-plan>.

¹²⁹ F. Khan, *Eating Grass*, 109.

in the Pakistani nuclear program. His placement and access in URENCO gave him routine contact with up-and-coming nuclear designs such as the German G-1 and G-2 centrifuges.¹³⁰ As discussed in Chapter II, centrifuges are a means to enrich uranium from U²³⁸ to U²³⁵. Khan offered access not only to centrifuge technology but also to the suppliers for these machines. He set up a network that exploited differences in import and export laws. These actions allowed Pakistan access to materials, such as high-strength aluminum, and parts required for advanced centrifuges.¹³¹ In the course of his work at URENCO, Khan established relationships with primary vendors, which allowed access and sales not available to the public. His later exploitation of this acquisition network for profit is a well-known story, outside the scope of this thesis.

The Pakistanis worked on simultaneous delivery systems. When they hit a technological barrier for missiles, they sought collaborative exchanges. For example, when North Korea lacked enough cash, the Pakistanis bought No-Dong missiles from them.¹³² Collaboration with the Chinese continued, and the Pakistanis sought technology transfers, not the articles themselves.¹³³ These actions guaranteed Pakistan a sustainable arms program. The Pakistanis applied this self sufficiency-based approach to most of the systems they purchased. In one specific case, the United States inadvertently helped the Pakistanis with missile technology. President Clinton ordered several Tomahawk missiles launched at terrorist camps in the U.S. attack on Afghanistan. As these missiles traveled over Baluchistan, some failed to reach their target and crashed.¹³⁴ The Pakistanis recovered and reverse-engineered a missile into what became their Babur cruise missile

¹³⁰ Michael Laufer, "A. Q. Khan Nuclear Chronology," Carnegie Endowment for International Peace, September 7, 2005, <http://carnegieendowment.org/2005/09/07/a.-q.-khan-nuclear-chronology>.

¹³¹ Douglas Frantz and Catherine Collins, *The Man from Pakistan: The True Story of the World's Most Dangerous Nuclear Smuggler* (New York: Twelve, 2008), 41–41.

¹³² Levy and Scott-Clark, *Deception*, 248–249.

¹³³ Feroz Khan, "Nuclear Security in Pakistan: Separating Myth from Reality," *Arms Control Today* 39, no. 6 (July/August 2009): 16–17, https://www.armscontrol.org/system/files/July_Aug_2009_ACT_Electronic.pdf.

¹³⁴ Blank, "Almost Alliance."

in service today.¹³⁵ Data gleaned from the Tomahawk missile also contributed to the Chinese DH-10 cruise missile.¹³⁶

The Pakistanis proved that where there is a will, there is a way. They were able to take a relatively impoverished and technically challenged nation and produce a credible nuclear capability. Pakistan's nuclear credibility and the U.S. desire for access to Afghanistan created a situation in which nuclear activities were acceptable, but an open nuclear weapons program was not. Analyzing the Pakistani proliferation case has caused groups like the Nuclear Suppliers Group to revise their practices in looking for nuclear deviance in the import/export communities.

The technological indicators of proliferation in this case study are the close collaboration with another nuclear state in nuclear matters, the networked approach to acquisition, the desire for non-safeguarded nuclear facilities, and concurrent delivery system development.

2. Economic Factors

Pakistan's regard for the economic impact of a nuclear program held different weights during the various phases of nuclear deliberation. For the Ayub Khan government, economic reform was the centerpiece, and nuclear weapons were an extravagance that ran counter to his government's efforts. Zulfikar Bhutto's administration adopted a nuclear imperative that spared no expense in its quest for the bomb. Zia's administration applied a combined approach that obfuscated nuclear intentions to keep international aid flowing. Once Bhutto made the decision, Pakistan's security superseded its economic concerns.

Ayub Khan argued that Pakistan could not afford such programs. Bhutto, Khan's foreign minister, argued that the country's security could not afford nuclear restraint if it

¹³⁵ Andrew Small, *The China-Pakistan Axis: Asia's New Geopolitics* (Oxford: Oxford Univ. Press, 2015), 41.

¹³⁶ Blank, "Almost Alliance."

could not prevent Indian “nuclear blackmail.”¹³⁷ Bhutto recognized that the modernization gained through the experience would have distributive effects on the economy.¹³⁸ The military necessity of a nuclear program was not established, so the 1965 war concluded Ayub Khan’s debate over nuclear weapons.

Bhutto placed Pakistan’s security at the forefront with his nuclear decision in the aftermath of the 1971 humiliation. When Prime Minister Bhutto directed the finance minister to spare no expense, he solicited fiscal support abroad himself. He lobbied Saudi Arabia, Libya, China, Iran, and Turkey for assistance.¹³⁹ He received considerable support from the Libyans, ranging from hundreds of millions of dollars to yellow cake.¹⁴⁰ Saudi Arabia’s considerable and enduring financial support is rumored to come with the strings of future Pakistani nuclear support to the Kingdom should the need ever arise.¹⁴¹ This fuels the common speculation that the Saudis would press Pakistan for support should they feel pressure from Iran. President Zia’s execution of Bhutto turned these somewhat stalwart allies against him, but the United States filled the financial disparity left by the vacuum. When the U.S. support withered and sanctions were imposed, Saudi Arabia provided sustaining support in the form of energy concessions.¹⁴²

In 1980, President Zia rebranded the Pakistani nuclear program in light of a deal cut with President Reagan. In exchange for access to Afghanistan, the United States offered significant financial aid. One of the conditions of the deal was Pakistan’s assurance of a peaceful nuclear program. As a result, President Zia issued a directive to his nuclear establishment: halt production of highly enriched uranium (HEU), cease

¹³⁷ F. Khan, *Eating Grass*, 118.

¹³⁸ *Ibid.*, 61.

¹³⁹ Levy and Scott-Clark, *Deception*, 20.

¹⁴⁰ Bhumitra Chakma, *Pakistan’s Nuclear Weapons* (London: Routledge, 2009), 109.

¹⁴¹ Colin H. Kahl, Melissa G. Dalton, and Matthew Irvine, “Atomic Kingdom: If Iran Builds the Bomb, Will Saudi Arabia Be Next?” Center for a New American Security, February 19, 2013, 23, http://www.cnas.org/sites/default/files/publications-pdf/CNAS_AtomicKingdom_Kahl.pdf.

¹⁴² Bruce Riedel, “Saudi Arabia: Nervously Watching Pakistan,” *Brookings*, January 28, 2008, <http://www.brookings.edu/research/opinions/2008/01/28-saudi-arabia-riedel>.

machining of HEU into weapon geometries, forgo hot testing, and stop transferring actual or intellectual nuclear technologies to other states.¹⁴³ As shown in Figure 4, the ebb and flow of U.S. funds and increased funding to Pakistan during the Soviet invasion of Afghanistan shored up the deficit left by Bhutto's death.

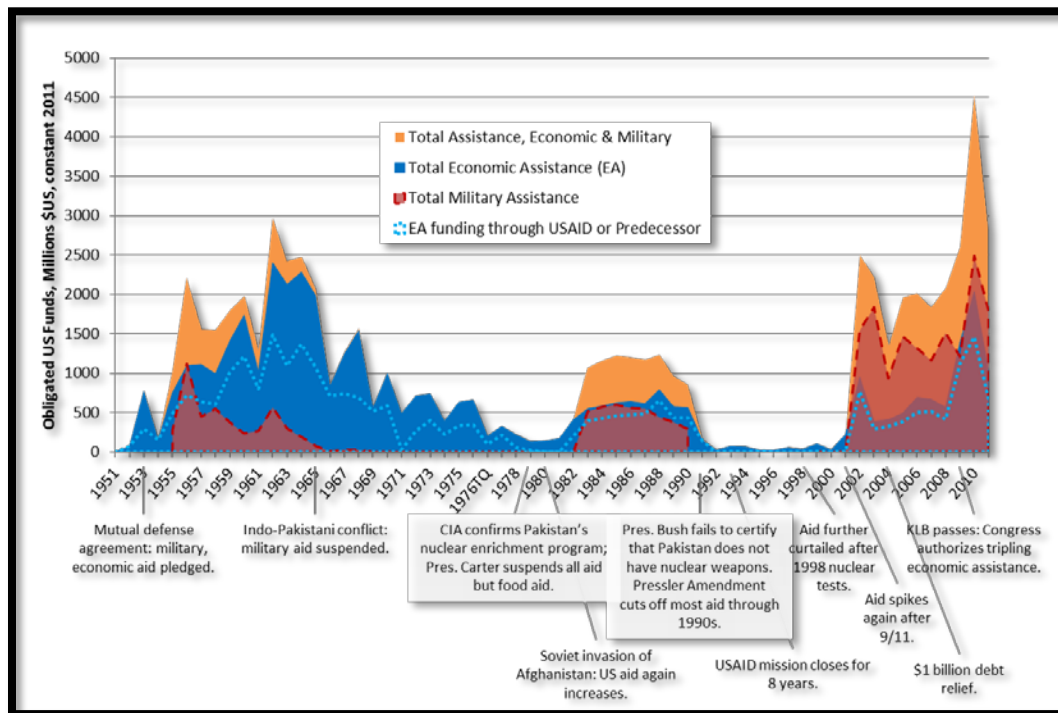


Figure 4. History of U.S. Fiscal Obligations to Pakistan through 2011, in Millions of U.S. Dollars¹⁴⁴

Pakistani leaders learned to practice nuanced diplomacy that deemphasized their nuclear program to secure financial aid whenever available. When the Soviets withdrew from Afghanistan and the strategic partnership with the United States waned, the Pakistanis chose their nuclear program over millions in economic aid. In 1990, President George H.W. Bush acknowledged Pakistan's nuclear weapons program by refusing to

¹⁴³ F. Khan, *Eating Grass*, 214.

¹⁴⁴ Source: "Aid to Pakistan by the Numbers," Center for Global Development, accessed September 4, 2016, <http://www.cgdev.org/page/aid-pakistan-numbers>.

certify its nonexistence. Bush's refusal triggered the provisions of the Pressler Amendment of 1986, cutting off most economic and military aid to Pakistan.¹⁴⁵ In 1998, the threat from India's nuclear test outweighed the economic benefits of nonproliferation for Pakistan, triggering a new round of sanctions under the Glenn Amendment.¹⁴⁶ Although economics plays a factor in Pakistani decision-making, economics ultimately yields to security measures.

F. INTERNATIONAL REGIMES

International nuclear regimes, such as the NPT and its watchdog the NSG, fostered ingenuity in Pakistan's diplomacy and acquisition approach. Pakistan held three differing positions on these regimes. First, emerging regimes were a means to improving its security position vis-à-vis India's. Second, regimes were an impediment to its nuclear objectives once the decision to go nuclear took place. Third, Pakistan viewed these regimes as Western bigotry that created a system of nuclear haves and have-nots. A side effect of these various regimes was that they created conditions to drive the Pakistanis into secrecy and improvisation. This section explores how the Pakistanis factored these international regimes into national decision-making and their pursuit for nuclear security.

Pakistan's zero-sum security view of India created an intractable position toward accession to restrictive nuclear regimes. Pakistan's acceptance of the NPT is contingent on India doing the same. Over the years, Pakistan has proposed joint attempts to allay nuclear fears, such as an Indo-Pakistan declaration rejecting acquisition or production of nuclear weapons, a South-Asian nuclear weapon-free zone, and joint acceptance of IAEA safeguards.¹⁴⁷ Pakistan offered these measures with the calculation that India

¹⁴⁵ Robert M. Hathaway, "Confrontation and Retreat: The U.S. Congress and the South Asian Nuclear Tests," Arms Control Association, January 1, 2000, https://www.armscontrol.org/act/2000_01-02/rhchart.

¹⁴⁶ Nazia Malik, "Economic Sanctions Imposed on Pakistan and Their Impact (1979–2001)," International Proceedings of Economics Development and Research, accessed July 13, 2016, <http://www.ipedr.com/vol39/028-ICITE2012-K00006.pdf>.

¹⁴⁷ A. H. Nayyar, *A Pakistani Perspective on Nuclear Disarmament and Non-Proliferation* (FES Briefing Paper 9) (Islamabad: Friedrich Ebert Stiftung, August 2009), <http://library.fes.de/pdf-files/iez/global/05652.pdf>.

would neither accept the terms nor give up security in the face of menacing China. This led to the nuclear status quo in South Asia today.

Zulfiqar Ali Bhutto's 1964 pro-bomb lobby was the first time Pakistan viewed the emerging NPT as a potential barrier to its nuclear options.¹⁴⁸ Bhutto contended that if the Khan government did not act hastily to secure nuclear expertise, the impending NPT restrictions would impede future consideration of nuclear weapons. Bhutto's attempt to use the NPT as an impetus for action failed, and he did not get to implement his nuclear ambitions until 1971.

In 1974, India's test sparked the creation of the London Suppliers Group, later, the NSG, to restrict nuclear technology further. The establishment of restrictive regimes had adverse effects on Pakistan; they forced improvisation and innovation in both the procurement and scientific communities. In the procurement community, the NSG restrictions forced buyers to find and exploit seams in import and export laws of European nations such as Switzerland.¹⁴⁹ When such exploitation failed, the Pakistanis employed illegal methods, such as industrial espionage and unscrupulous suppliers like the Tinner family, to supply precision centrifuge parts.¹⁵⁰ Within the scientific community, sanctions and restrictions pushed the Pakistanis to abandon the pursuit of plutonium when its plutonium reprocessing deal with France fell through at the behest of U.S. pressure.¹⁵¹ The United States hoped to deny fissile material production to the Pakistanis by pressuring Western suppliers, but the Pakistani scientific community turned its focus on mastering uranium enrichment.

¹⁴⁸ F. Khan, *Eating Grass*, 61.

¹⁴⁹ Leonard Downie Jr., "Swiss Send Nuclear Aid to Pakistan," *Washington Post*, September 21, 1980, <https://www.washingtonpost.com/archive/politics/1980/09/21/swiss-send-nuclear-aid-to-pakistan/38734906-194e-4382-a4b7-967d07d7bd02/>.

¹⁵⁰ Tim Nelville, "Lessons Not Yet Learned in Tinner Nuclear Case," *Swissinfo*, December 22, 2010, <http://www.swissinfo.ch/eng/lessons-not-yet-learned-in-tinner-nuclear-case/29092606>.

¹⁵¹ David Albright and Serena Kelleher-Vergantini, *Pakistan's Chashma Plutonium Separation Plant: Possibly Operational* (Washington, DC: Institute for Science and International Security, February 20, 2015), http://isis-online.org/uploads/isis-reports/documents/Chashma_February_20_2015_Final.pdf.

The United States made various attempts to block Pakistan's pursuit of weapons; it offered incentives, such as military and economic aid, and threatened sanctions for noncompliance. The Glenn, Symington, and Pressler Amendments associated economic costs with continued proliferation, but "waivers-for favors" during the Cold War undermined the effects.¹⁵² Feroz Khan credits U.S. efforts for instilling "a norm of norm-defiance" in the Pakistanis.¹⁵³ The U.S. effort to raise the cost of nuclear weapons beyond Pakistan's threshold hardened Pakistani resolve to produce nuclear weapons. An unintended consequence was Pakistan's characterization of a country standing up to the West, thereby captivating the Muslim community.¹⁵⁴

The Pakistanis managed a national policy of ambivalence toward international regimes. On the one hand, if India had acceded to the NPT, Pakistan would have followed suit. On the other hand, Pakistan continued to work around these regimes to secure the materials necessary to build a nuclear capability. The United States offered rewards and punishments for Pakistan's nuclear program, but Pakistan's need for security outweighed both.

G. CONCLUSION

Pakistan's quest for nuclear weapons represents a case in which international regimes and foreign incentives were not strong enough factors to dissuade an eager government faced with an existential threat. The threat of a nuclear India propelled the military, scientific communities, and politicians to unite in their efforts. Pakistan's national unity led to a comprehensive approach to secure nuclear weapons. This section reviews how these factors created an environment for proliferation over hedging.

Pakistan was a nation born out of rivalry with India. The 1947, 1965, and 1971 Indo-Pakistani wars cemented this rivalry into a national heritage. Because of these wars,

¹⁵² "The Pressler Amendment and Pakistan's Nuclear Weapons Program (Senate – July 31, 1992)," Federation of American Scientists, accessed June 13, 2016, <http://fas.org/news/pakistan/1992/920731.htm>.

¹⁵³ Feroz Hassan Khan, "Nuclear Proliferation Motivations: Lessons from Pakistan," *The Nonproliferation Review* 13, no. 3 (2010): 507–508, doi: 10.1080/10736700601071553.

¹⁵⁴ *Ibid.*, 511.

the Kashmir region continues to provide a source of border tension. The almost three-to-one latent and military advantage held by India over Pakistan compounds these tensions. The manner in which Pakistan lost the 1971 war, which resulted in the loss of half its country to a dominant Indian force, led to the belief that Pakistan needed to offset India's conventional forces.

Conventional war alone did not heighten Pakistan's sense of threat. India's foray into nuclear reprocessing in 1965 and its subsequent peaceful nuclear explosion in 1974 introduced nuclear concerns into the competition. The Indian reprocessing center at Trombay established the credibility of an Indian nuclear program that made some in the Pakistani government uneasy.

The disparity in alliances disappointed Pakistan greatly. The Pakistanis had built their strategy of aligning with superpowers, such as the United States and the United Kingdom, upon faulty expectations. The Western powers sought to counterbalance Soviet influence rather than back Pakistan in its skirmishes with India. This misalignment ultimately provoked security self-determination in the Pakistanis. The left portion of Figure 5 depicts the culmination of individual threat factors that pushed Pakistan beyond nuclear hedging into pursuit.

The military, political, and scientific communities achieved unity concerning nuclear weapons in 1972. After Bhutto's rise to power in 1971 under martial law, he quickly consolidated power by appointing General Zia-ul-Haq as the Chief of Army Staff and Munir Khan as the head of the PAEC. With these three institutions synchronized, nuclear-weapon exploration and the subsequent pursuit began.

Pakistan lacked the technical capability in manufacturing and access to nuclear technologies. However, it had trained professionals in the PAEC, thanks to Usmani's efforts. The nationalist pursuit instilled an "improvise and overcome" mentality in all involved. This applied to the scientific fields as well as the purchasing agents abroad seeking to secure the necessary materials. One cannot overlook the role foreign help played throughout this process; the Chinese supply of UF_6 , weapons designs, and HEU gave a significant boost to the program.

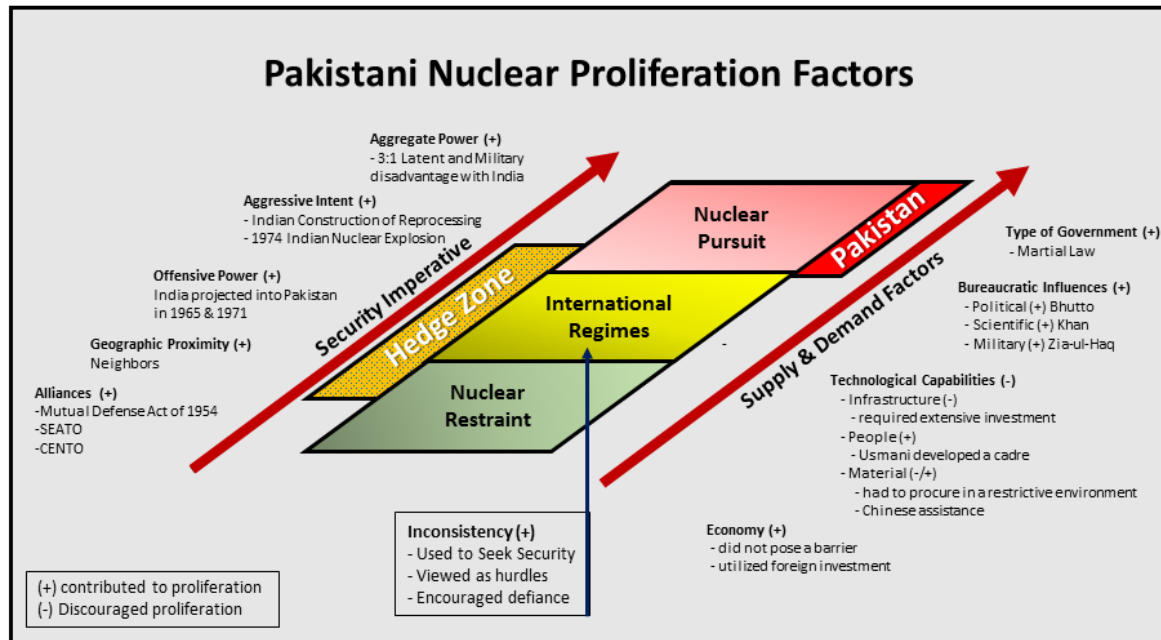


Figure 5. Factors Contributing to Pakistani Nuclear Proliferation

The Pakistani economy took a backseat to the pursuit of nuclear weapons once Bhutto assumed power. Bhutto provided financial offsets through foreign investment in the Pakistani nuclear program. Zia-ul-Haq offset expenses with U.S. funds received during the Soviet invasion of Afghanistan. Whereas Bhutto was brash in his signaling and pursuit of nuclear weapons, Zia offered a more discreet approach to avoid inflaming U.S. sensitivities. Figure 5 shows the culmination of supply and factors on the right side that converged to create a nuclear capability.

The Pakistanis attempted to leverage international regimes to maximize their security position. It was clear that India would not sign the NPT before Pakistan and vice versa. Once in pursuit of weapons, Pakistan viewed international regimes as hurdles to its security goals. U.S. diplomacy tried to influence the Pakistanis but was unable to shift Pakistani intent. An attitude of defiance toward the West and ambivalence toward nuclear regimes took hold. As shown in Figure 5, international regimes present a decision space to consider the consequences of nuclear pursuit. In the case of Pakistan, the security gained outweighed the consequences of the international regimes.

The Pakistani case demonstrates what a determined country can accomplish when its security imperatives are in line with a consistent and coherent strategy. Hedging was not enough. Pakistan's inability to compete with India militarily or to count on Western alliances drove it to seek security self-sufficiency through nuclear weapons. International regimes unsuccessfully addressed Pakistan's security requirements and were subsequently disregarded, creating the conditions for nuclear pursuit.

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IV. JAPAN CASE STUDY: THE CONSUMMATE HEDGE

“It is in the interest of the United States, so long as it does not wish to see Japan withdraw from the NPT and develop its own nuclear deterrent, to maintain its alliance with Japan and continue to provide a nuclear umbrella.”¹⁵⁵

—Japanese Prime Minister Morihiro Hosokawa

A. INTRODUCTION

Former Japanese Prime Minister Hosokawa’s statement highlights the basic premise of Japan’s nuclear hedge: Japan receives U.S. protection in exchange for its continued nuclear restraint and role as a standard bearer for nonproliferation norms. Japan’s advanced nuclear fuel cycle and technological knowledge establish the credibility of its nuclear hedge. Once again, this proliferation case focuses on the intersection of threat, domestic factors, and external regimes. Japan’s threats arise from North Korea, a nuclear-armed adversary, and China, a nuclear-armed competitor. It balances these threats with agreements of mutual defense from the United States and its extended nuclear umbrella.

The Japanese public’s adverse reaction to nuclear-weapon ownership holds the government back from nuclear acquisition. The Japanese constitution reflects the public’s sentiment through its regulation of defense forces. However, this stance is changing. Where it was once heresy to speak of a deployable military in Japan, it is now a reality. Where it once was politically unacceptable to speak of Japanese nuclear weapons in the Diet, the discussion is now taking place.¹⁵⁶ Complicating the matter even further is

¹⁵⁵ Morihiro Hosokawa, “Are U.S. Troops in Japan Needed? Reforming the Alliance,” *Foreign Affairs* 77, no. 1 (Summer 1998): 4, <https://www.foreignaffairs.com/articles/asia/1998-07-01/are-us-troops-japan-needed-reforming-alliance>.

¹⁵⁶ Kurt M. Campbell, “Reconsidering a Nuclear Future: Why Countries Might Cross over to the Other Side,” in *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed. Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Reiss (Washington, DC: Brookings, 2004), 19.

Japan's leadership in global nonproliferation efforts. Japan has been seen globally as the paragon of nonproliferation norms. By continually revisiting the nuclear armament discussion, Japan reaffirms its security commitment with the United States, leveraging its abilities to go nuclear and its stature in the nonproliferation community.

This chapter investigates Japan's nuclear hedge using the analytic construct from Chapter II. The first section examines Japan's post-World War II nuclear history. The second section analyzes Japan's threat from China and North Korea and its subsequent strategies to offset through alliance. The next section surveys domestic concerns, specifically government policy and the consistent debate over nuclear weapons while also examining technological and economic factors associated with nuclear concerns. The fourth section examines the role of nonproliferation regimes in the national nuclear calculus. This chapter concludes by examining Japan as a paragon of nuclear hedging and, in contrast to Pakistan, a clear case of nuclear acquisition to elucidate factors that drive nuclear hedging.

B. HISTORY

Japan's history provides evidence of an interest in nuclear weapons. During World War II, Japan briefly pursued nuclear weapons to no avail; the country ultimately found that the lack of resources restricted pursuit.¹⁵⁷ The unconditional surrender of Japan in the wake of the Hiroshima and Nagasaki bombings and the subsequent U.S.-led administration suppressed the discussion of Japanese nuclear weapons for the next few decades. In the reestablishment of the Japanese government in 1947, its constitution forbade the right to declare war and use force to solve international disputes.¹⁵⁸

¹⁵⁷ Campbell, "Reconsidering a Nuclear Future," 20.

¹⁵⁸ Ministry of Foreign Affairs of Japan. *Japan's Disarmament and Non-Proliferation Policy*, 5th ed. (Tokyo: Ministry of Foreign Affairs of Japan, March 2011), 2, <http://www.mofa.go.jp/policy/un/disarmament/policy/pdfs/pamph1103.pdf>.

Following World War II, the United States recognized Japan's strategic importance as both a counter to communist aggression and a means of extended presence in the Pacific. Specifically, a Japanese presence counterbalanced rising communism in China, served as a logistical staging base for the Korean War, and became a power projection platform for the Vietnam conflict. When China emerged as a nuclear nation in 1964, the United States extended its umbrella of nuclear deterrence over Japan. At the end of the Cold War when the United States began talks with Russia to limit the strategic arms, Japan questioned the saliency of the U.S. nuclear umbrella and debated the merits of its own nuclear program. Once again, the U.S. promise of protection quelled Japanese concerns.

In 2016, nuclear neighbors North Korea and China pose challenges to Japanese security that have reignited old debates over the credibility of the nuclear umbrella and the efficacy of nuclear restraint. The past 60 years resembles a rollercoaster of spiked Japanese security concerns and steady security reassurances from the United States that have maintained the nuclear status quo. A pattern of events has elevated Japanese concerns repeatedly, but U.S. security assurances have brought the Japanese back to the accepted norm of extended nuclear deterrence. A sequence of key events that highlights this cycle was assembled over the course of this research (see Figure 6). The next section analyzes the threats posed by China and North Korea as well as the Japanese response.

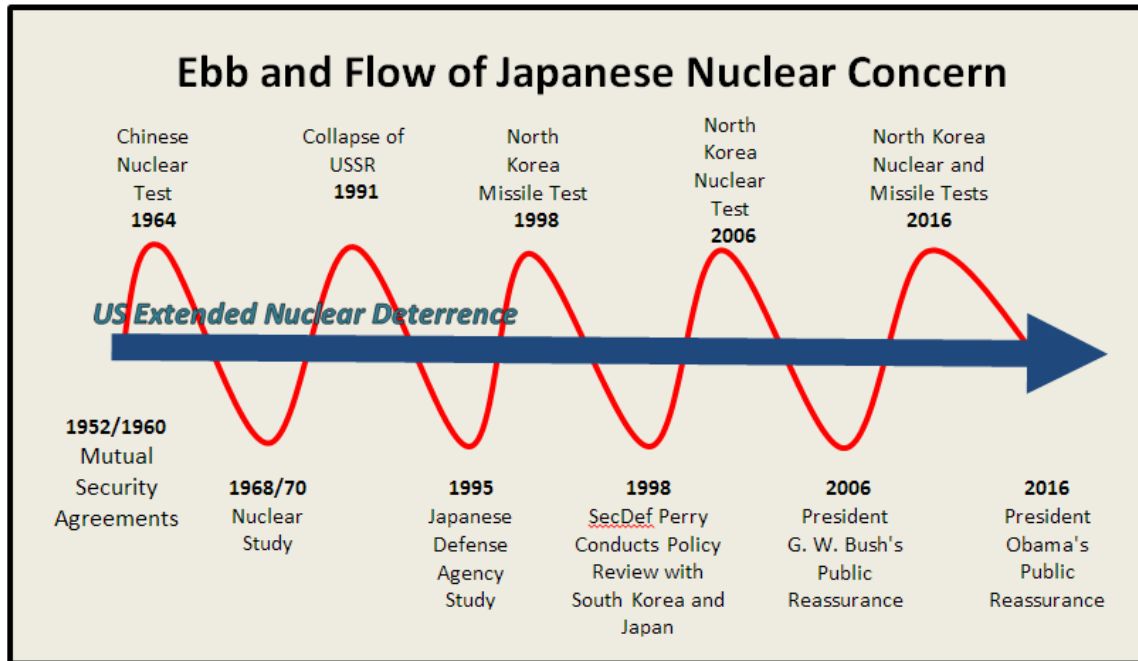


Figure 6. Ebb and Flow of Japanese Nuclear Concern

C. ANALYZING JAPAN'S EVOLVING SECURITY THREATS

Japan's security environment is increasingly complex. The security challenges revolve around two consistent threats: China and North Korea. Brutal Japanese occupation during World War II engendered cultural antipathy toward Japan that still exists in its rivals today. Japan faces a boisterous, nuclear North Korea that remains undeterred by international sanctions. Japan also has to contend with China, a rising economic behemoth, which is vigorously asserting itself throughout the region. This section examines these two primary sources of threat to Japan.

China enjoys a distinct military and economic advantage over Japan. While Japan ranked eighth in worldwide defense spending in 2015 at \$41 billion, China ranked second

at \$145.8 billion.¹⁵⁹ Table 2 depicts Japan deficit in comparison to China’s latent and military strength—even before introducing nuclear weapons. Japan is not as large geographically as China, so it does not require the force that China deems necessary to maintain an adequate defense. Whereas China possesses strategic rocket forces and other offensive capabilities, Japan invests heavily in defensive capabilities such as ballistic missile defense and next generation aircraft. Over the past five years, both nations have gradually modernized their militaries, and this trend looks to continue.

Table 2. Chinese and Japanese Latent and Military Strength in 2016¹⁶⁰

Latent Strength	<u>China</u>	<u>Japan</u>	<u>+/- Diff</u>
Population	1,374,626,494	126,919,659	90.77%
GDP	\$10.4 Trillion	\$4.6 Trillion	65.77%

Military Strength	<u>China</u>	<u>Japan</u>	<u>+/- Diff</u>
Manpower	2,843,000	303,250	89.43%
Tanks	6540	688	89.48%
Aircraft	2306	557	75.85%
Surface Combatant Ships	74	47	36.49%
Submarines	61	18	70.5%

China’s modernization of its nuclear forces, in conjunction with heavy investment in anti-access and area denial capabilities (A2AD), challenges Japanese defensive plans by offsetting the competitive advantage of the United States. China’s Dongfeng-41 nuclear intercontinental ballistic missile (ICBM) upgrade program is expected to extend

¹⁵⁹ International Institute for Strategic Studies, “Chapter Two: Comparative Defense Statistics,” *The Military Balance* 116, no. 1 (2016): 19, doi: 10.1080/04597222.2016.1127562.

¹⁶⁰ International Institute for Strategic Studies, “Chapter Six: Asia,” *The Military Balance* 116, no. 1 (2016): 211–306, doi: 10.1080/04597222.2016.1127567.

missile ranges to 14,000 kilometers.¹⁶¹ This new generation of mobile missiles ensures survivability of China's retaliatory capabilities. Despite China's no-first-use reassurances, these upgrades—coupled with the advent of the DF-21 family of medium range ballistic missiles designed to target aircraft carriers—paint a troubling picture for security in the region.¹⁶² Chinese modernization, while touted as defensive in nature, provides challenges to the regional status quo.

China's recent aggression in the Senkaku Islands in the East China Sea remains the foremost point of contention between the two nations. Much like the case with the Spratly and Paracel Islands of the South China Sea, China is challenging Japan's ownership of the Senkaku islands by asserting its historical ownership. Despite Japan's de facto ownership since 1895, China claims that Japan's nationalization of the Islands is invalid.¹⁶³ Japan routinely conducts air and sea patrols to discourage continuous Chinese excursions within 60 miles of the islands. The 2014 meeting between Japanese Prime Minister Shinzo Abe and Chinese President Xi Jinping offered a brief respite to tensions, but recent challenges to the Senkaku Islands following The Hague's ruling in favor of the Philippines in the South China Sea continues to threaten East-Asian security.¹⁶⁴

¹⁶¹ Ariana Navarro Rowberry, *Advanced Conventional Weapons, Deterrence and the US–Japan Alliance* (Washington, DC: Brookings, 2014), 9, <https://www.brookings.edu/wp-content/uploads/2016/07/Advanced-Conventional-Weapons-Deterrence-and-the-USJapan-Alliance-Rowberry.pdf>.

¹⁶² Richard D. Fisher Jr., "China Reveals DF-21 MRBM Manoeuvrable Warhead," *IHS Jane's 360*, February 15, 2016, <http://www.janes.com/article/58013/china-reveals-df-21-mrbm-manoeuvrable-warhead>.

¹⁶³ Jean-Marc F. Blanchard, "The U.S. Role in the Sino–Japanese Dispute over the Diaoyu (Senkaku) Islands, 1945–1971," *The China Quarterly* 161 (2000), 101, doi: 10.1017/S0305741000003957.

¹⁶⁴ Matt Schiavenza, "An Awkward—and Productive—Exchange between China and Japan," *The Atlantic*, November 11, 2014, <http://www.theatlantic.com/international/archive/2014/11/Chinas-Xi-Jinpings-Handshake-With-Japans-Shinzo-Abe-Was-Awkward/382626/>; Steven Stachwick, "That Chinese Frigate in the Senkakus Was a Bad Move for China," *The Diplomat*, June 13, 2016, <http://thediplomat.com/2016/06/that-chinese-frigate-in-the-senkakus-was-a-bad-move-for-china/>.

Across the Sea of Japan resides Japan's other threat, nuclear North Korea. North Korea's defiance of international norms, political instability, and past actions raise concerns for the Japanese. North Korea's march to nuclear weapons has exacerbated fears and reinvigorated debate over the role of the Japanese military and its potential ownership of a nuclear deterrent. North Korea began testing the Nodong missile in 1993 by conducting test flights in the Sea of Japan.¹⁶⁵ Japan's threat assessment concluded that the Nodong was capable of striking downtown Tokyo with a 700–1200 kg payload within seven to ten minutes after launch.¹⁶⁶ North Korea did not stop at the Nodong but continued development of larger longer-range weapons such as the Taepodong and Musadan families of missiles.¹⁶⁷ In 2006, North Korea conducted its first nuclear test. Japanese Prime Minister Shinzo Abe immediately condemned the test as a “serious threat to the security of Japan and South Korea, and neighboring countries.”¹⁶⁸ President George W. Bush immediately reassured Abe that the United States would “meet the full range of [its] deterrent and security commitments.”¹⁶⁹ In light of North Korean advancements and subsequent tests, President Obama has echoed the same commitments.

North Korea's conventional force, although formidable in size, is primarily oriented for a ground-based war with South Korea. The numbers in Table 3 indicate that North Korea lacks the ability to project its forces abroad. Today, North Korea's strategic missile forces and their nuclear capabilities are the principal threat to Japan.

¹⁶⁵ “North Korean Missiles,” Federation of American Scientists, last modified February 17, 2016, <http://fas.org/nuke/guide/dprk/missile/nd-1.htm>.

¹⁶⁶ Narushige Michishita, *Japan's Response to Nuclear North Korea*, vol. 23 (Washington, DC: Korean Economic Institute, 2003), 101, http://www.keia.org/sites/default/files/publications/narushige_michishita_final_paper_-_japans_response_to_nuclear_north_korea_joint_u.s.-korea_academic_studies_volume_2012.pdf.

¹⁶⁷ “North Korea Missile Capabilities,” Nuclear Threat Initiative, accessed August 10, 2016, <http://www.nti.org/analysis/articles/north-korea-missile-capabilities/>.

¹⁶⁸ Martin Fackler, “Nuclear Test is Likely to Push Japan from Pacifism,” *New York Times*, October 9, 2006, <http://www.nytimes.com/2006/10/09/world/asia/10japancond.html?pagewanted=print>.

¹⁶⁹ “President Bush's Statement on North Korea Nuclear Test,” White House, October 9, 2006, <https://georgewbush-whitehouse.archives.gov/news/releases/2006/10/20061009.html>.

Table 3. North Korean and Japanese Latent and Military Strength in 2016¹⁷⁰

Latent Strength	<u>North Korea</u>	<u>Japan</u>	<u>+/- Diff</u>
Population	24,983,205	126,919,659	-80.32%
GDP	~\$40 Billion	\$4.6 Trillion	-99.13%

Military Strength	<u>North Korea</u>	<u>Japan</u>	<u>+/- Diff</u>
Manpower	1,190,000	303,250	74.52%
Tanks	4060	688	83.05%
Aircraft	545	557	-2.15%

Japanese security finds challenges in a modernizing China that not only competes economically with Japan but also seeks to assert itself militarily in contested areas such as the Senkaku Islands. The undeterred nuclear march of Kim Jung-un's North Korea continues to cast a shadow over Japan as Japanese leaders contemplate how to confront the North Korean threat. The next section explores the Japanese approach of allying with the United States to offset its security threats.

D. ALLIANCES AS AN OFFSET TO NUCLEAR ACQUISITION

The United States forged an enduring alliance with post–World War II Japan. The United States, under the Supreme Command for the Allied Powers (SCAP), led a three-phase reconstruction effort that punished war criminals, rebuilt the economy, and concluded with a lasting peace treaty.¹⁷¹ In the first phase, Japan's constitutional revision occurred with the initial draft written by the Japanese and the final version by the senior U.S. officers of SCAP. The final draft forbade the Japanese from maintaining a military and left them dependent on the United States for protection.

¹⁷⁰ "The World Factbook: Japan," Central Intelligence Agency, last modified August 15, 2016, <https://www.cia.gov/library/publications/the-world-factbook/geos/kn.html>; International Institute for Strategic Studies, "Chapter Six: Asia," *The Military Balance* 116, no. 1 (2016): 211–306, doi:10.1080/04597222.2016.1127567.

¹⁷¹ "Occupation and Reconstruction of Japan 1945–52," U.S. Department of State, accessed September 6, 2016, <https://history.state.gov/milestones/1945-1952/japan-reconstruction>.

The Japanese people resumed governance in 1947, and in 1951, the Treaty of Peace fully restored Japanese sovereignty. At the same time, Japan signed the Treaty of Mutual Cooperation and Security, an agreement between it and the United States. Similar to the NATO Charter, Article V of the Mutual Cooperation and Security Treaty commits the United States to defending Japan.¹⁷² As these treaties took effect, they allowed Japan to adopt the Yoshida doctrine. The Yoshida doctrine provided a framework of Japanese foreign policy predicated on continued reliance on the United States for defense, which strengthened foreign relations to enable domestic economic reconstruction and helped Japan remain globally inconspicuous.¹⁷³ As fighting in Korea commenced, U.S. forces were unavailable for Japanese security. At the behest of the United States, a Japanese force was established. This force evolved into the current Japanese Self Defense Force (SDF) in existence today.

Japan focused primarily on economic reconstruction until the Chinese tested a nuclear weapon. This test spurred a series of studies on the feasibility of Japanese nuclear armament. The first was called the *1968/70 Internal Report*.¹⁷⁴ After the fall of the Soviet Union, Japan initiated another study regarding nuclear armament. The third study, in 1995, became known as the Japanese Defense Agency Report.¹⁷⁵ This report was set against growing Japanese concern that an absence of Soviet threat and improving U.S.–Sino relations would compromise U.S. protection for Japan. Inflaming these post–Cold War concerns with Russia, the Chinese began modernizing their nuclear arsenal while the United States and Russia were downsizing nuclear missile forces. In all cases, the studies

¹⁷² Governments of the United States and Japan, “U.S.–Japan Joint Declaration on Security,” Federation of American Scientists, April 17, 1996, <http://fas.org/news/japan/11318448-11333165.htm>.

¹⁷³ David M. Potter, “Evolution of Japan’s Postwar Foreign Policy,” Center for International Education, Nanzan University, accessed September 6, 2016, https://office.nanzan-u.ac.jp/cie/gaiyo/kiyo/pdf_09/kenkyu_03.pdf.

¹⁷⁴ Yuri Kase, “The Costs and Benefits of Japan’s Nuclearization: An Insight into the *1968/70 Internal Report*,” *The Nonproliferation Review* 8, no. 2 (2001): 55–68, doi: 10.1080/10736700108436850.

¹⁷⁵ Michael J. Green and Katsuhisa Furukawa, “New Ambitions, Old Obstacles: Japan and Its Search for an Arms Control Strategy,” Arms Control Association, accessed September 11, 2016, https://www.armscontrol.org/act/2000_07-08/japanjulaug.

found that continued reliance on extended nuclear deterrence of the United States was in Japan's best interest.

The advent of Chinese military modernization and North Korean nuclear and ballistic missile testing sparked increased defense spending in Japan. Talk of nuclear acquisition in lieu of U.S. security reliance persists in the wake of recent North Korean overtures, but Japan keeps returning to the value of extended deterrence and accepts periodic reaffirmed commitments from the United States. It is clear that when faced by a bifurcated threat in North Korea and rising Chinese assertiveness, the Japanese conclude that it is in their best interest to bandwagon with the United States.

E. DOMESTIC FACTORS

Contemplation of nuclear weapons is a contentious issue in Japan; mere talk of nuclear armament has caused political cabinets to fall. It is often said that in the wake of Hiroshima and Nagasaki and the subsequent testing of the U.S. hydrogen bomb, Japan has developed a "nuclear allergy," that makes sheer mention of nuclear weapon pursuits politically untenable and emotional.¹⁷⁶ However, as the Chinese and North Korean threats evolve, so does increased acceptance of nuclear rhetoric. Nascent discussions regarding nuclear weapons—starting as early as Prime Minister Kishi's 1957 assertion that nuclear weapons may not violate Japan's constitution—continue today.¹⁷⁷ This section explores the deliberations and studies that have led to Japan's present-day hedging strategy.

In 1964, the Chinese nuclear test provoked Prime Minister Sato's administration to contemplate nuclear pursuit.¹⁷⁸ In the interim, Sato secured a pledge from Lyndon

¹⁷⁶ Evan Osnos, "The Fallout: Seven Months Later: Japan's Nuclear Predicament," *The New Yorker*, October 17, 2011, <http://www.newyorker.com/magazine/2011/10/17/the-fallout>.

¹⁷⁷ Richard J. Samuels and James L. Schoff, "Japan's Nuclear Hedge: Beyond 'Allergy' and Breakout," in *Strategic Asia 2013–14: Asia in the Second Nuclear Age*, ed. Ashley J. Tellis, Abraham M. Denmark, and Travis Tanner (Seattle: National Bureau of Asian Research, 2013), 5.

¹⁷⁸ Yuki Tatsumi, "Maintaining Japan's Non-Nuclear Identity: The Role of U.S. Security Assurances," in *Security Assurances and Nuclear Nonproliferation*, ed. Jeffrey W. Knopf (Palo Alto, CA: Stanford University Press, 2012), 142.

Johnson assuring the mutual defense treaty included extension of nuclear deterrence.¹⁷⁹ In 1967, in an effort to bring the discussion of nuclear weapons before the Diet, Prime Minister Sato delivered his three non-nuclear principles speech. He introduced his three non-nuclear principles of not manufacturing, possessing, or permitting introduction of nuclear weapons to Japan. Although he hoped to spark a debate over Japan's armament, the Japanese government adopted his principles as a strategy. Fearing that the last principle would restrict U.S. extended deterrence, Sato further introduced the four nuclear pillars in 1968.¹⁸⁰ These pillars comprise the following:

1. Promotion of Peaceful Nuclear Energy
2. Global Disarmament
3. Reliance on the U.S. for Deterrence
4. Continued Support for the 3 Non-Nuclear Principles.¹⁸¹

Unsatisfied with the promise of extended deterrence alone, Sato commissioned a study to determine the feasibility of a Japanese nuclear deterrent. This study is known as the "Basic Study on Japan's Nuclear Policy" or the 1968/70 Report. The report was split into two efforts: the first report, completed in 1968, focused on the technical, financial, and organizational aspects of a nuclear weapons program, and the second half, the 1970 portion, analyzed the pros and cons through strategic, political, and diplomatic aspects.¹⁸²

The 1968 portion of the report found that while nuclear armament was possible, it was not feasible due to cost, constraint, and complexity. The report focused on the internal matters relating to nuclear buildup. Specifically, the report cited public disapproval; IAEA restrictions regarding reprocessing of nuclear material; resource constraints, both material and fiscal; and difficulty developing complementary

¹⁷⁹ Samuels and Schoff, "Japan's Nuclear Hedge," 4.

¹⁸⁰ Kurt M. Campbell and Tysuoshi Sunohara, "Japan: Thinking the Unthinkable," in *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed. Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Reiss (Washington, DC: Brookings, 2004), 223.

¹⁸¹ Ibid.

¹⁸² Kase, "Costs and Benefits of Japan's Nuclearization, 57.

technology, such as missile guidance, required to enable a deterrent as roadblocks to nuclear pursuit.¹⁸³

The 1970 report focused on the “up and out” aspects relating to nuclear pursuit. It examined the Chinese threat, the strategic implications of nuclear acquisition, and the political and diplomatic challenges such an endeavor presents.¹⁸⁴ The findings concluded that the U.S. nuclear deterrent was an effective counter against China. The analysis also found that nuclear possession might increase the risk of a first strike. Considering Japan’s population density, of which 50 percent of the population lived on 20 percent of the land, a nuclear exchange would prove disastrous to Japan. Nuclear pursuit also ran the risk of leaving Japan isolated by provoking the Soviet Union and China while causing irreparable damage to its alliance with the United States.¹⁸⁵ The report held the standard that if nuclear pursuit could guarantee Japanese security, it was worth the endeavor. The conclusion of the study made it crystal clear that a Japanese nuclear program could not guarantee Japanese security. The 1968/1970 reports valued continued reliance on U.S. extended deterrence. Concurrent internal foreign policy in 1969 stated that Japan should maintain a capability to develop weapons while simultaneously advocating nonproliferation.¹⁸⁶ It was in this era that the Japanese nuclear hedge was born.

Japan took a turn toward nonproliferation, but it did not put the nuclear pursuit discussion to rest. A report conducted by the Japanese Defense Agency (JDA) in 1970 found that nuclear weapons could be produced in less than five years at a cost of 200 billion yen.¹⁸⁷ The JDA’s 1995 “Report on the Problems of the Proliferation of Weapons of Mass Destruction” revisited the 1970 assessment to come to the same conclusion that nuclear pursuit was possible, but nuclear abstention was in Japan’s interest from both

¹⁸³ Tatsumi, “Maintaining Japan’s Non-Nuclear Identity,” 143.

¹⁸⁴ Kase, “Costs and Benefits of Japan’s Nuclearization,” 58.

¹⁸⁵ Ibid.

¹⁸⁶ Michael J. Green and Katsuhisa Furukawa, “Japan: New Nuclear Realism,” in *The Long Shadow: Nuclear Weapons and Security in 21st Century Asia*, ed. Muthiah Alagappa (Palo Alto, CA: Stanford University Press, 2008), 351.

¹⁸⁷ Ibid.

fiscal and security perspectives.¹⁸⁸ When leaked, this assessment secured a pledge of extended deterrence from United States President Clinton.¹⁸⁹ The academic rigor behind these reports and the strategic leaking of them to the public served Japan well in securing continual security assurances from the United States.

Presently, Prime Minister's Abe's cabinet continues to debate nuclear pursuit by referencing the constitutionality of nuclear weapons in hypothetical situations.¹⁹⁰ Taking into consideration the recent upgrade of the Japanese Defense Agency to the Ministry of Defense in 2007 and the 2015 change in article IX of the Japanese constitution that allows deployment of the armed forces abroad for collective defense, the political climate paints a situation in which nuclear pursuit is open for discussion once again.¹⁹¹ These discussions are not without political cost, as the revision of Article IX of the Japanese constitution resulted in physical altercations on the Diet floor.

Complicating Japan's nuclear hedge is the fact that the population is largely anti-nuclear. Sato's approach to the nuclear debate to desensitize the nuclear issue backfired when he presented it to the Diet in 1967. In 1999, Deputy Vice Minister of Defense Shingo Nishimura advocated the departure from nuclear restraint, which sparked protests resulting in his resignation.¹⁹² During a college lecture in 2003, Shinzo Abe angered the student population by reasserting the constitutionality of nuclear weapons. After the North Korean test in 2006, a poll showed that 80 percent of the surveyed population

¹⁸⁸ Ibid., 352.

¹⁸⁹ United States and Japan, "U.S.-Japan Joint Declaration."

¹⁹⁰ Julia Glum, "Japan's Constitution Allows Nuclear Weapons, Says Shinzo Abe's Government after Donald Trump Comments," *International Business Times*, April 4, 2016, <http://www.ibtimes.com/japans-constitution-allows-nuclear-weapons-says-shinzo-abes-government-after-donald-2347884>.

¹⁹¹ Yuki Tatsumi and Andrew L. Oros, *Japan's New Defense Establishment: Institutions, Capabilities, and Implications* (Washington, DC: Henry L. Stimson Center, 2007), 5, <http://www.stimson.org/sites/default/files/file-attachments/Japan's%20New%20Defense%20Establishment.pdf>; Matt Ford, "Japan Curtails Its Pacifist Stance," *The Atlantic*, September 19, 2015, <http://www.theatlantic.com/international/archive/2015/09/japan-pacifism-article-nine/406318/>.

¹⁹² Howard W. French, "Furor in Japan as Military Official Advocates Nuclear Weapons," *New York Times*, October 21, 1999, <http://www.nytimes.com/1999/10/21/world/furor-in-japan-as-military-official-advocates-nuclear-weapons.html>.

opposed an independent Japanese nuclear arsenal.¹⁹³ Despite public dismay toward his position, Abe continues to reassert the legality of nuclear weapons as the current prime minister.¹⁹⁴

While images of World War II reinforce the population's pacifism, the recent Article IX debate demonstrates political will to depart from popular support on issues of security. Within all the bluster of nuclear discussion, the key problems of susceptibility to first strike, the resulting deleterious diplomatic effects, increased regional volatility, and the damage to the U.S. alliance have yet to be adequately addressed. The continual nuclear discussion reinforces Japan's nuclear hedge by revisiting old problems without new solutions for security assurances while actively desensitizing a nuclear-allergic population.

1. Technological Factors

Today, Japan's state of nuclear expertise is the key factor in supporting its nuclear hedge. Japan's mastery of the nuclear fuel cycle rivals or exceeds most nuclear weapon states. It answers the international question of whether it is possible for Japan to go nuclear. The challenge Japan faces in nuclear pursuit is in mobilizing the energy and scientific communities to deviate from their norms to support nuclear armament. The reality is that there is a resident industrial capability to nationalize should Japan choose to do so. This section briefly looks at nuclear energy in Japan, the scientific and energy communities' concerns with nuclear acquisition, and the challenge of military application.

Japan, like many other countries, started its nuclear energy program under President Eisenhower's "Atoms for Peace," initiative. The United States presented

¹⁹³ Paul Midford, "Balancing Threats Foreign and Domestic: The Case of Japanese Public Opinion and the 2007 Upper House Election," in *Governing Insecurity in Japan: The Domestic Discourse and Policy Response*, ed. Wilhelm Vosse, Reinhard Drifte, and Verena Blechenger-Talcott (New York: Routledge, 2014), 32.

¹⁹⁴ Glum, "Japan's Constitution Allows Nuclear Weapons."

nuclear energy in an attempt to downplay the negative public perception of its nuclear arsenal.¹⁹⁵ In Japan, the aversion to all things nuclear was at a fever pitch as a result of the 1954 irradiation of the Japanese fishermen aboard the *Lucky Dragon Five* by U.S. hydrogen-bomb testing at Bikini Atoll.¹⁹⁶ Despite this unfortunate event, Japan signed the Atomic Energy Basic law into effect and subsequent nuclear cooperation agreement with the United States that provided Japan with HEU.¹⁹⁷ Within a year of adoption, nuclear energy became key to the Japanese energy strategy. By 1957, the Japanese contracted the construction of 20 more reactors.¹⁹⁸ As of 2016, Japan uses nuclear power to offset the 84 percent of energy requirements it imports.¹⁹⁹

Japan's reprocessing capability is what gives the nation a comparative advantage should it seek nuclear weapons. Reprocessing allows a nation to develop plutonium if it pursues weapons. This capability alone allows Japan to revisit nuclearization. When it first acceded to the NPT, Japan sought assurances from the United States that its rights to reprocess would not be infringed upon. Japan's expenditure of over \$25 billion and thirty years to bring the not-yet-functional Rokkasho reprocessing facility online demonstrates its unwavering commitment to this advanced fuel-cycle capability.²⁰⁰

The inherent conflict between the energy industry and the government further complicates Japan's nuclear hedge. Should the government conduct research into the

¹⁹⁵ Peter Kuznick, "Japan's Nuclear History in Perspective: Eisenhower and Atoms for War and Peace," *Bulletin of the Atomic Scientists*, April 13, 2011, <http://thebulletin.org/japans-nuclear-history-perspective-eisenhower-and-atoms-war-and-peace-0>.

¹⁹⁶ Ran Zwigenberg, "'The Coming of a Second Sun': The 1956 Atoms for Peace Exhibit in Hiroshima and Japan's Embrace of Nuclear Power," *The Asia-Pacific Journal* 10, no. 1 (2012), <http://apjif.org/2012/10/6/Ran-Zwigenberg/3685/article.html>.

¹⁹⁷ U.S. Department of Energy, *Highly Enriched Uranium: Striking a Balance*, (Washington, DC: GAO, 2001), 100, <http://fas.org/sgp/othergov/doe/heu/>; Tatsumi, "Maintaining Japan's Non-Nuclear Identity," 139.

¹⁹⁸ Kuznick, "Japan's Nuclear History."

¹⁹⁹ "Nuclear Power in Japan," World Nuclear Organization, accessed July 21, 2016, <http://www.world-nuclear.org/information-library/country-profiles/countries-g-n/japan-nuclear-power.aspx>.

²⁰⁰ Stephen Stapczynski and Emi Urabe, "Japan's \$25 Billion Nuclear Recycling Quest Enters 28th Year," *Bloomberg News*, January 5, 2016, <http://www.bloomberg.com/news/articles/2016-01-04/japan-s-25-billion-nuclear-recycling-quest-enters-28th-year>.

military application of nuclear weapons using its national brain trust, it would come at a risk of international exposure to the energy companies. This exposure could lead to sanctions that cut off nuclear fuel, such as uranium, and technology that complicates the energy industry's ability to operate at capacity. This risk also resonates with the scientists who support the nuclear power industry, for they do not wish to see their access to innovative technologies denied. Katsuhisa Furukawa claims that the strong streak of pacifism in the scientific and academic communities presents further challenges to military application.²⁰¹ Ultimately, it is in the interest of the energy companies and the attitudes of the scientific community to avoid aiding a government's illicit nuclear activities. Mobilizing industrial and scientific communities aside, Japan's Atomic Energy Agency (JAEA) possesses enough plutonium isotope 240 (PU₂₄₀) to make numerous nuclear weapons.²⁰² While PU₂₄₀ is not optimal for producing weapons, it is sufficient for a hedge arsenal.

If Japan seeks a credible deterrent, it will have to address many technical and non-technical challenges in creating one. The immediate concern is in building the nuclear explosive package (NEP), which requires warhead design and metallurgical experience to fabricate it. The design would have to integrate delivery systems, such as missiles, submarines, or bombs, to deliver the NEP to its target.²⁰³ Integration of these systems requires testing facilities that raise the signature of the program. To reduce these signatures, the effort requires a substantial counter-intelligence program. Establishment of a deterrent also requires strategic doctrine regarding command and control, survivability, and use. None of these restraints are insurmountable for a highly advanced,

²⁰¹ Katsuhisa Furukawa, "Japan's Nuclear Option," in *Over the Horizon Proliferation Threats*, ed. James J. Wirtz and Peter R. Lavoy (Palo Alto, CA: Stanford University Press, 2012), 25.

²⁰² Furukawa, "Japan's Nuclear Option," 25. Plutonium 240 is not considered optimal for weaponization, but the IAEA considers any plutonium isotope significant.

²⁰³ James L. Schoff, *Realigning Priorities: The U.S.–Japan Alliance & the Future of Extended Deterrence* (Cambridge, MA: Institute for Foreign Policy Analysis, March 2009), 47, <http://www.ifpa.org/pdf/RealignPriorities.pdf>.

technical nation that already possesses a nuclear fuel cycle. The challenge is building a team from a bench of disparate experts who are likely ideologically opposed to the effort.

Today, Japan's state of nuclear capacity supports its policy of nuclear hedging. The Japanese mastery of the nuclear fuel cycle and possession of advanced nuclear capabilities normally resident in nuclear weapon states allows for the quick transition demanded by Levite's definition of nuclear hedging. Japan's nuclear fuel cycle supports rapidly producing the nuclear weapon a hedging strategy demands, but military integration and delivery-system development present challenges for a turn-key deterrent.

2. Economics

Japan is currently the third largest economy in the world. The Yoshida doctrine put Japan on that trajectory. The 1968/70 report's warnings that Japanese nuclear pursuit would isolate the nation politically apply equally to its economics. Japan has done the calculations of what a program costs to build, but the true cost is the economic impact of sanctions resulting from exposure. This section explores the real cost associated with nuclear pursuit or, conversely, the benefit of hedging.

Japan currently imports \$624 billion worth of goods and exports \$625 billion.²⁰⁴ It ranks fourth in the world for exporting goods. Its key trading partners in both import and export markets are the United States and China.²⁰⁵ Breaking out from the NPT would likely force sanctions from both of these members of the United Nation's Security Council.²⁰⁶ Considering Japan's dependence on imported raw materials, such as oil, food, and metals, the effects of sanctions are less likely impact partners than Japan itself.²⁰⁷

²⁰⁴ "The World Factbook: Japan," Central Intelligence Agency.

²⁰⁵ Ibid.

²⁰⁶ Nikitin, *North Korea's Nuclear Weapons*, 9.

²⁰⁷ Schoff, *Realigning Priorities*, 7.

Japan's energy security is also an important factor. Japan is second only to the United States in oil imports.²⁰⁸ Japan's key energy partners include Saudi Arabia, the UAE, Qatar, and China. Economic sanctions as a result of nuclear pursuit would constrain not only imports of fossil fuels but also the receipt of nuclear fuel to power Japan's energy plants, which represented approximately 29 percent of total energy production in 2010.²⁰⁹ In the post Fukushima experience, the nuclear energy lobby is persuading an eventual return to nuclear power despite mass protests from the population. Japan's "new growth" strategy is predicated on becoming an exporter of nuclear energy infrastructure to countries such as Vietnam.²¹⁰ For large national companies, such as Mitsubishi and Hitachi, the potential to lose out on future international deals is high.²¹¹ It is logical that these multi-national corporations' interests would lobby against government policy that undermines their profitability.

Japan's subtle nuclear hedge was recently referenced in connection with American economic commitments. Speaking on behalf of Asian partners of the Trans-Pacific Partnership, Singapore Prime Minister Lee Hsien Loong stated that the U.S. potential inability to follow through on the trade deal might signal a similar unwillingness to make good on its commitment to provide Japan with extended deterrence.²¹² This statement highlights regional awareness of the reciprocal nature of Japan's nuclear hedge and its ability to leverage the United States. There is a fine balance to this tactic; the United States has adroitly shown the ability to decouple security during the trade discussions of the late eighties and early nineties.

²⁰⁸ "What Countries Are the Top Net Importers of Oil?" United States Energy Information Administration, last modified June 18, 2015, <https://www.eia.gov/tools/faqs/faq.cfm?id=709&t=6>.

²⁰⁹ Richard J. Samuels, *3.11: Disaster and Change in Japan* (Ithaca: Cornell University Press, 2013), 117.

²¹⁰ Samuels, *3.11*, 150.

²¹¹ Samuels and Schoff, "Japan's Nuclear Hedge," 3.

²¹² "U.S. Failure to Ratify TPP Will Make Japan Rethink Security, Hurt U.S. Credibility in Region, Singapore's Lee Tells Obama," *The Japan Times*, August 3, 2016, <http://www.japantimes.co.jp/news/2016/08/03/business/economy-business/u-s-failure-ratify-tpp-will-make-japan-rethink-security-hurt-u-s-credibility-region-singapores-lee-tells-obama/#.V6ozJ5MrIp8>.

In Japan's security situation, economic interdependence serves as a deterrent from going nuclear. For a nation that thrives on the export market and survives on the import market, nuclear pursuit comes at a high cost while nuclear hedging provides a low-cost alternative.

F. INTERNATIONAL REGIMES

Japan's relationship with nonproliferation regimes represents an unusual dichotomy. Japan is the most ardent supporter of nonproliferation, which perennially pushes the UN General Assembly for a global ban on nuclear weapons, yet it relies on those same U.S. weapons for its vital security interests. Japan has a long track record of not only joining various non-proliferation institutions but also being a standard bearer and one of their most active members. This section explores the nonproliferation history of Japan and its implications for nuclear hedging.

Japan joined the IAEA in 1957 and was the first nation to receive nuclear energy assistance under nuclear safeguards.²¹³ The Japanese acquiesced to the NPT in 1970 and ratified it in 1976 after much debate. Prime Minister Sato, the author of the Japan's four pillars of nonproliferation, acceded to U.S. pressure in light of the guarantee of extended deterrence. Japan acceded to the NPT to secure two things from the United States: continued protection under the nuclear umbrella and recognition of its right to reprocess.²¹⁴ In 1974, Sato received the Nobel Peace Prize in a similar aspirational manner as President Obama in the aftermath of his Prague speech.²¹⁵ The Nobel Prize cemented his four nuclear pillars within the Japanese government although Sato was rumored to have private concerns about the policy. In 1977, Japan agreed to the

²¹³ Kazuko Godo, "Japan's Role as Leader for Nuclear Nonproliferation," Federation of American Scientists, December 2002, 5, https://fas.org/_docs/2012IssueBrief_Japan.pdf.

²¹⁴ Campbell and Sunohara, "Japan: Thinking the Unthinkable," 225.

²¹⁵ "Eisaku Sato - Facts," Norwegian Nobel Institute, accessed September 6, 2016, https://www.nobelprize.org/nobel_prizes/peace/laureates/1974/sato-facts.html.

comprehensive safeguards of a non-nuclear weapon state and found itself a staunch nonproliferation advocate with a significant resident nuclear capability.²¹⁶

In current times, Japan continues to be a stalwart nonproliferation advocate. It has been an upstanding member of the NSG and a member of the MCTR since 1987 and has pushed for the Comprehensive Nuclear Test Ban Treaty.²¹⁷ Only once has Japan balked in the face of nonproliferation, the permanent extension of the NPT in 1995. Prior to providing its signature to the extension, Japan secretly researched the benefits of nuclear nationhood in the 1995 Japanese Defense Agency Study and contemplated not signing the extension.²¹⁸ Japan has since signed the additional protocol to the NPT in 1999.²¹⁹ In the wake of the North Korean tests, Japan quickly imposed unilateral economic sanctions and has been a staunch advocate for disarmament.

Japan has joined every nonproliferation venture. A departure from nonproliferation would impose significant consequences to international nonproliferation norms. Since ratifying the NPT in 1976, the Japanese have pursued a pragmatic dual-track approach that seeks security through the aspiration of a nuclear-free world balanced with the reality of its protection under a nuclear umbrella. Japan's strict adherence and leadership role in nonproliferation regimes strengthens its hedge. Japan's departure from nonproliferation regimes could create a domino effect of nations that proliferate. If the United States prevents proliferation and Japan's desired end-state is continued extended deterrence, it is in U.S. interest to continue providing extended deterrence to Japan.

²¹⁶ Tatsumi, "Maintaining Japan's Non-Nuclear Identity," 144.

²¹⁷ "MTCR Partners," Missile Technology Control Regime, accessed September 6, 2016, <http://www.mtrc.info/english/partners.html>.

²¹⁸ Campbell and Sunohara, "Japan: Thinking the Unthinkable."

²¹⁹ "Status List, Conclusion of Safeguards Agreements, Additional Protocols and Small Quantities Protocols," International Atomic Energy Agency (IAEA), June 30, 2016, https://www.iaea.org/sites/default/files/16/07/sg_agreements_comprehensive_status_list.pdf.

G. CONCLUSION

Japan is a nation that lives dual lives. In one life, Japan is a staunch realist that understands its regional security needs and the implications of its actions in reference to its nuclear neighbors. In the other life, its idealistic drive to nuclear zero through nonproliferation and disarmament stands in stark contrast to its possession of the nuclear infrastructure to produce a bomb while living under the protection of a nuclear umbrella. It views both efforts as complementary and seeks to ensure that while there are nuclear weapons in the world, they will not be left unsecured. This section concludes by comparing and contrasting the Japanese case with the Pakistani case to highlight the differences in the case studies.

In comparing the element of threat between Japan and Pakistan, both nations face overwhelming challenges with the aggregate power of their nuclear-armed adversaries. Japan differs starkly from Pakistan in that it does not share a land border with its adversary. Nevertheless, both nations share contested regions with their adversaries, the Senkaku Islands and Kashmir, respectively. Japan enjoys the physical separation of water that inhibits its adversary's ability to occupy territory. Whereas the Pakistanis must contend with the possible invasion of a nuclear-armed adversary, the Japanese focus on contested territories separated from the homeland where the escalation ladder is extended and major war is less likely.

Pakistan has attempted to offset latent and military disadvantages with India through the alliances of CENTO and SEATO. Unfortunately, Pakistan's allies diverged in their security goal. While Pakistan needed security from India, CENTO and SEATO sought to counter the spread of communism. Pakistan also made miscalculations about the terms of its defense treaty with the United States. The Mutual Defense Treaty of 1954 promised U.S. aid in the case foreign invasion of Pakistan, but the United States could not be reasonably expected to back aggression against India.

The Japanese approach of the Yoshida Doctrine supported by the Mutual Defense Treaty of 1952 created a defense that steadily grew together with the United States against threats of mutual strategic importance. This was largely based on Japan's security

dependence. This contrasts sharply with the strain of Pakistan's multiple conflicts with India, the rocky relationship with Washington, and its relationship with China.

The case studies illustrate Pakistan's divergence and Japan's convergence with U.S. security interests. Pakistan sought nuclear security from India, a threat that diverged with U.S. interests. Japan seeks security from North Korea and China and ardently strives to maintain the convergence of security interests with the United States. The underlying finding is that properly maintained alliances are critical in forestalling nuclear pursuit. A potential indicator trending toward nuclear pursuit is divergence from allies whereas convergence may indicate abstention or nuclear hedging.

The interaction of political, military, and scientific communities in Pakistan allowed for the unified pursuit of nuclear weapons. Prime Minister Bhutto unified these groups upon the assumption of power under martial law. In democratic Japan, these institutions remain disconnected. Cabinets fell upon the mere suggestion of nuclear pursuit, making the topic a politically charged one. Changes such as the posture of the Japanese Self Defense Force have sparked protest and even political fist fights. The military, as evidenced in the Japanese Defense Agency report, remains pragmatic in its evaluation of Japan's nuclear posture, citing the advantages of continued alliance and disadvantages of cost and strategic implications of nuclear ownership. It must also be said that Japan's armed forces also favor leaving a hedge option open should conditions change. Also, the energy industry in Japan runs the vast majority of the nuclear energy and research enterprise. An attempt to pursue nuclear weapons in Japan immediately puts politics, profit, and patriotism in conflict.

In Pakistan, Bhutto put his own man in charge of the PAEC, an entity that nationalized Pakistan's nuclear efforts. This action gave him independent control over the scientific community. As demonstrated in Pakistan, an increased collusion of military, scientific, and political communities serves as a potential indicator of nuclear pursuit. Political ambiguity based on a public posture of not developing weapons but maintaining capability is indicative of nuclear hedging.

Technological development is a strong determinant of the ability to produce nuclear weapons. A high level of nuclear development reduces the time it takes a nation to build a weapon. In Pakistan's case, a technologically backward, poor nation was able to harness the intellectual capability of its scientific community with the help of loyal expatriates, luck, and considerable foreign assistance from China to produce an indigenous nuclear fuel cycle and weapons program. Pakistan's case also highlights the concurrent development of delivery technologies with foreign assistance to produce its nuclear deterrent.

In Japan's case, the technological building blocks are present in disparate areas of industry but lack a unifying effort. The threat to put these blocks together is what makes the Japanese hedge effective. Japan can launch satellites into space, manage a ballistic missile defense, enrich and reprocess nuclear fuel, and even possess the significant quantities of SNM required to produce a bomb. Indicators of pursuit are substantial rapid investment in the nuclear fuel cycle and increased interactions with a nuclear weapon state. Continued lack of horizontal synchronization within the technological communities may be indicative of a hedging state.

Pakistan evaluated the economic worth of security independence. The cost of its nuclear pursuit came at considerable loss of foreign aid and access to emerging technologies as a result of sanctions for its nuclear pursuit. It capitalized on significant, sympathetic Islamic allies, such as Saudi Arabia and Libya, to fund its nuclear program in times of need. Pakistan also benefited from sporadic periods of strategic importance that provided respite from sanctions. It provided a staging base for U-2 spy planes in the 1960s, a projection platform for CIA efforts in Afghanistan in the 1980s, and a logistic hub for the recent Afghan invasion by the United States. Pakistan leveraged its geopolitical advantages to gain space for its nuclear program.

Japan's approach to security differs. It does not seek security independence; it seeks security guarantees. It was thrust into an alliance with the United States upon resuming its sovereignty and fell under the U.S. nuclear umbrella after the Chinese nuclear test. A policy of hedging allows Japan to maintain consistent support for its security and economic interests and remain a loyal ally to the United States. Japan is the

fourth-largest exporter of goods and a nation reliant on foreign energy imports. The risk of sanction for illicit nuclear activities would mobilize industry and the population to protest at the risk incurred to the economy and standards of living. Unresponsiveness to economic sanctions may serve as an indicator of pursuit while increased economic interdependence favors a continued policy of hedging.

The value of and interpretation of international regimes, such as the NPT, factors heavily in nuclear pursuit and restraint. The Pakistanis rejected nonproliferation efforts. From the lens of their bipolar security rivalry with India, these arrangements provided no benefits. If nuclear weapons went away tomorrow, India would still be left with a comparative advantage. This has prompted Pakistan to adopt the defiant attitude of accepting international nonproliferation norms as soon as India does. Japan's revered position in the nonproliferation community is reflective of its population's acquired allergy toward nuclear weapons. Japan's ensconced position within the nonproliferation community also allows a different diplomatic approach. Politically, Japan can leverage its participation in nonproliferation activities to ensure U.S. guarantees of protection. For nations that steadily advocate nonproliferation, changes in rhetoric or upticks in nuclear discussions may indicate the need for increased assurance. Threats of departure or decreases in nonproliferation advocacy may support a hedging strategy.

In summary, threat drives nuclear considerations, as depicted in Figure 7. Alliances count, but the convergence of mutual security interests within those alliances is more important for ensuring security. The United States underwrote Japanese security vis-à-vis North Korea and China but walked away from Pakistan in its perpetual conflict with India. Disconnects among the political, military, and scientific communities favor hedging whereas unity favors pursuit. A relevant, resident technological capability is required to make a nuclear hedge credible whereas increased rapid investment and foreign assistance indicates nuclear pursuit. Internationally interdependent economies favor hedging or restraint. A strong valuation of nonproliferation regimes lends to restraint but can accentuate a hedging strategy. The next chapter seeks to apply these observations to the Saudi Arabian case to illuminate the implications of the JCPOA.

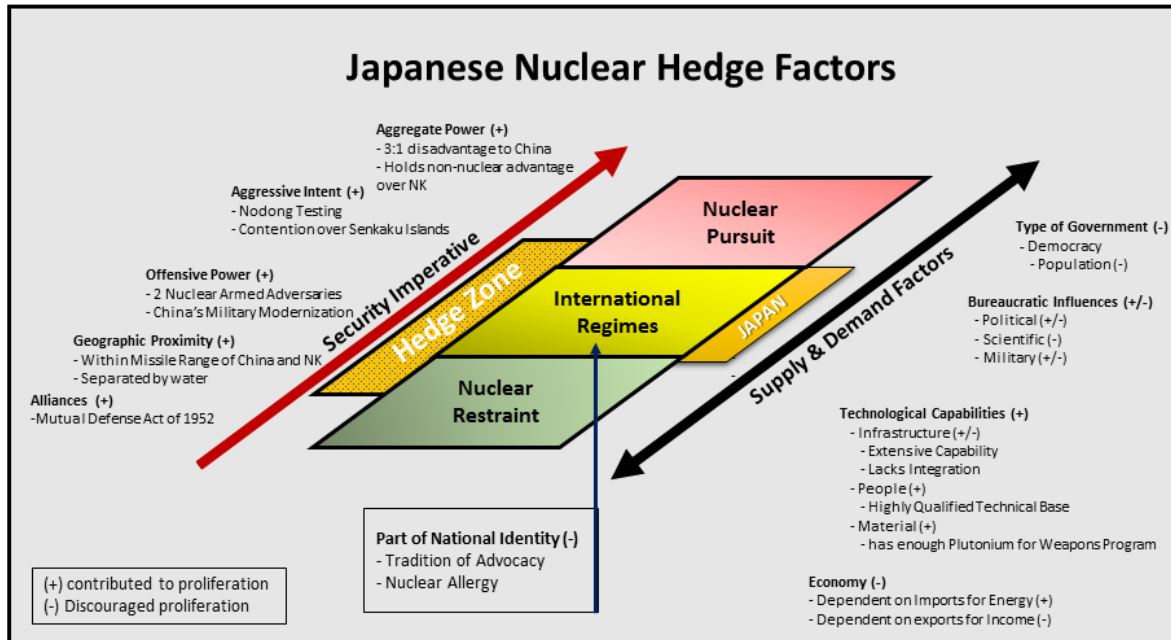


Figure 7. Japanese Nuclear Hedge Factors

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V. SAUDI ARABIA: NOT QUITE A HEDGE

“Saudi Arabia will do whatever it takes to protect the nation and people from any harm and I will leave it at that.”

—Saudi Foreign Minister Abel Al-Jubier

A. INTRODUCTION

Foreign Minister Abel Al-Jabier offered this ambiguous statement to CNN’s Wolf Blitzer when pressed for the official Saudi position on nuclear weapons vis-à-vis Iran in the wake of the Joint Comprehensive Plan of Action (JCPOA).²²⁰ The plan, adopted on October 18, 2015, and implemented on January 16, 2016, seeks to prevent Iran’s ability to pursue nuclear weapons. Some international leaders, such as Secretary of State Kerry, herald the agreement as a triumph of diplomacy that has prevented an Iranian nuclear program, which has been in the works for over 20 years. Others, such as Wyn Bowen and Matthew Moran, conclude that the deal resulted in international acceptance of nuclear hedging.²²¹ In the deal, Iran preserved its uranium enrichment capability in exchange for increased monitoring by the IAEA to achieve sanction relief. While the merits of the deal are debatable, its duration is finite. There is no guarantee that Iran will show restraint after the agreement expires in 15 years. This begs the question as to whether Saudi Arabia will follow suit and invest in a nuclear-hedging capacity.

In the lead-up to the agreement, Saudi Arabian insiders were quick to offer statements intimating that if Iran gets the bomb, they would follow suit. After the agreement, the views of Saudis varied—from directly opposing the arrangement, to maintaining equivalent abilities by enriching nuclear fuel, to King Salman’s publicly

²²⁰ Ashley Fantz, “Saudi Foreign Minister Deeply Skeptical of Iran Deal,” *CNN*, January 19, 2016, <http://www.cnn.com/2016/01/19/politics/situation-room-saudi-arabia-foreign-minister/>.

²²¹ Bowen and Moran, “Living with Nuclear Hedging,” 694.

endorsing the JCPOA.²²² Pundits take different views regarding the Saudis' ability to match Iran. Fareed Zakaria asserts that Saudi Arabia is incapable of producing an automobile let alone nuclear weapons.²²³ Prince Turki al-Faisal countered in an interview that Zakaria might have to "eat his words" when the first Saudi car rolls off the assembly line in a few years.²²⁴ In this interview, Prince Turki al-Faisal also asserts that Saudi Arabia has embarked on an odyssey to ensure that the country's investment in nuclear power materializes as the Iran deal expires.

The JCPOA highlights the advanced state of Iranian nuclear research while exposing the dearth of capability in security rivals such as Saudi Arabia and Egypt. This chapter incorporates the methods and findings of the previous two chapters to analyze the Kingdom's potential to hedge from the perspectives of threat, domestic factors, and international regimes. This chapter commences with a brief history to highlight how Iran transcended from an ideological threat to a regional adversary of Saudi Arabia. The second section evaluates the Iranian threat to Saudi Arabia and the Saudi relationships with the United States and Pakistan. The third section scrutinizes Saudi Arabian domestic concerns, such as intergovernmental capacity, technological capability, and economic factors, that either aid or prevent Saudi nuclear hedging. The fourth section weighs the Saudi attitude toward international regimes and the effect it has on the Saudi nuclear calculus. The chapter concludes with a summary and evaluation of the factors pertaining to Saudi nuclear proliferation as well as their implications for nuclear hedging.

B. HISTORY

In 1932, King Abd al-Aziz Ibn Saud formally established the Kingdom of Saudi Arabia and subsumed the Hijaz region, known for the holy cities of Mecca and Medina.

²²² Jaffe, "Saudi King Visits U.S."; "Joint Statement on the Meeting between President Barack Obama and King Salman bin Abd alAziz Al Saud," White House, September 4, 2015, <https://www.whitehouse.gov/the-press-office/2015/09/04/joint-statement-meeting-between-president-barack-obama-and-king-salman>.

²²³ Zakaria, "Can't Get a Nuclear Weapon."

²²⁴ Drollette, "View from the Inside," 22.

The Kingdom began as an impoverished nation until prospects of oil emerged in the 1930s, and foreign investors started paying for oil exploration rights to the Kingdom. The Kingdom granted first oil exploration rights to the United States because Americans bore no colonial intent.²²⁵ World War II prevented the Kingdom's and U.S. petroleum companies from capitalizing on the newfound oil reserves. The U.S. government recognized the strategic importance of Saudi Arabian oil reserves as well as the substantial American investment in the country and subsidized the impoverished Saudi economy under the Lend Lease Act.²²⁶

The U.S.–Saudi security relationship grew with the economic development of the Kingdom. This relationship weathered turbulence when the United States recognized Israel in 1948 and subsequently aided the Israelis in the 1973 Arab–Israeli War, which resulted in the infamous oil embargo against the United States and its Western allies. The Saudis were tolerant of the relationship the United States maintained with the Iranians as both Iran and Saudi Arabia found consensus in their anti-communist, pro-Western views. The fall of the Shah during the Iranian revolution surfaced Saudi fears of a rising Iranian hegemon based on the ideological zeal of Ayatollah Khomeini and the residual military capabilities of Iran.²²⁷ The Saudis counter-balanced Iran by backing Saddam Hussein's military with financial aid and airfield usage rights.²²⁸ The increased regional hostilities and the Iran hostage crisis prompted the United States to create the United States Central Command (CENTCOM) to reassure regional partners.²²⁹ CENTCOM-led efforts in the 1980s to protect Kuwaiti and Saudi tankers devolved into open hostilities between the United States and Iran known as the “tanker wars.” Saudi–Iranian tensions spiked during

²²⁵ David E. Long, *The United States and Saudi Arabia: Ambivalent Allies* (London: Westview Press, 1985), 13.

²²⁶ *Ibid.*, 33.

²²⁷ Erik R. Peterson, *The Gulf Cooperation Council: Search for Unity in a Dynamic Region* (Boulder, CO: Westview Press, 1988), 77–78.

²²⁸ David Crist, *The Twilight War: The Secret History of America's Thirty-Year Conflict with Iran* (New York: Penguin, 2012), 206.

²²⁹ “U.S. Central Command History,” U.S. Central Command, accessed August 23, 2016, <http://www.centcom.mil/about-us/uscentcom-history>.

this era, culminating in a thwarted Iranian attempt to stage an attack in Saudi Arabia during the 1987 Hajj in which 450 Iranians perished at the hands of Saudi security forces.²³⁰

Shortly before the collapse of communism, Saddam Hussein's 1990 invasion of Kuwait threatened the Middle-Eastern status quo. A U.S.-led coalition, which included Saudi Arabia, was quick to eject Hussein from Kuwait and restore sovereignty to the Kuwaitis. In the late 1990s, reports of Iranian nuclear exploration began to emerge.²³¹ In 1996, President Clinton signed sanctions against Iran and Libya for weapons of mass destruction (WMD) procurement and support of terrorism.²³² A steady string of indicators emerged over the following years pointing to Iranian uranium enrichment and a pattern of refusing IAEA inspections. During the breakup of the A. Q. Khan ring, inspectors discovered that Khan had shared centrifuge technology with Iran.

When the U.S.-led invasion of Iraq commenced in 2003, Saudi Arabia openly advised against the effort, fearing that without Hussein, Iraq would tilt toward a Shia majority sympathetic to Iran. Since the fall of Iraq and the extension of Iranian influence in Baghdad's politics, Saudi Arabia has witnessed growing Iranian influence through Hezbollah in Lebanon, the Shiite militias in Iran, the Iranian-backed Houthi rebels in Yemen, and the Iranian support for Bashar Asad's Syrian regime.

The revelation of an Iranian nuclear enrichment program and its suspected military applications has further unsettled Iranian and Saudi relations. In the run up to the signature of the JCPOA, Saudi Arabia joined Israel in sharing reservations about the

²³⁰ Mabon, *Saudi Arabia and Iran*, 52–53.

²³¹ Shreeya Sinha and Susan Campbell Beachy, "Timeline on Iran's Nuclear Program," *New York Times*, April 2, 2015, http://www.nytimes.com/interactive/2014/11/20/world/middleeast/Iran-nuclear-timeline.html?_r=1#/time243_7250.

²³² William J. Clinton, "Remarks on Signing the Iran and Libya Sanctions Act of 1996 and an Exchange with Reporters," Washington, DC, August 5, 1996, accessed September 4, 2016, <http://www.presidency.ucsb.edu/ws/index.php?pid=53160#axzz1rCW0GB2A>.

deal.²³³ The underlying fear was that the agreement would embolden Iran's support of its regional proxies and leave a latent nuclear capability that Iran could restart should it chose to abrogate the deal. The next section explores the threat calculus of Saudi Arabia and looks at its alliance options in the face of a nuclear Iran.

C. SECURITY FACTORS

Scholars often frame Iran and Saudi Arabia as ideological opponents in the simplistic manner of Sunni versus Shia. In the Middle Eastern perspective, security is a zero-sum game wherein the rise of one nation's offensive capability and security detracts from the others. Saudi Arabia seeks to maintain the status quo in the Middle East by offsetting threats. It has shown no compunction in dealing with the likes of secular nationalists like Saddam Hussein in regards to Iran and does not hesitate to pursue its own policies, such as acquiring missiles from China, when denied by the United States. The current contest in the Middle East is a battle for the fringe states in which a lack of governance reigns and the ability to influence populations persists.²³⁴

Traditionally, Saudi Arabia has found its security rival in Israel, but that is changing as an assertive Iran challenges both nations. As such, Saudi Arabia's primary security threats arise from Iran's proxy engagement and nuclear capability. From the Saudi Arabian perspective, instability in Yemen and Iraq and the rise of the Islamic State in Iraq and Syria (ISIS) are intractably linked to Iran. These threats culminate to challenge the legitimacy of the Kingdom in its role of defender of the *Umma*, or the collective Muslim community.²³⁵ In the case of Yemen, Saudi Arabia seeks to assert its regional leadership and maintain influence by restoring a failed regime against Iranian-

²³³ Richard Spencer and Robert Tait, "Israel and Saudi Arabia Present United Front over Iran Deal," *The Telegraph*, July 14, 2015, <http://www.telegraph.co.uk/news/worldnews/middleeast/iran/11739349/Israel-and-Saudi-Arabia-present-united-front-over-Iran-deal.html>.

²³⁴ Gause, "Beyond Sectarianism," 1.

²³⁵ Norman Cigar, *Saudi Arabia and Nuclear Weapons: How Do Countries Think about the Bomb?* (New York: Routledge, 2016), 28.

armed Houthi rebels; a loss in Yemen would undermine Saudi credibility in the region.²³⁶ Regarding Iraq, Saudi concern originates from the Iranian Revolutionary Guards Council (IRGC)-supported Shiite militias fighting on behalf of the Iraqi government. Both Iran and Saudi Arabia view the Iraqi government as a battleground for influence with both investing heavily in political candidates.²³⁷ ISIS also presents a unique challenge as it forces Saudi Arabia to contend with growing domestic extremism and the ideological challenge to the royal family by Al Baghdadi's assertion of caliph over the Islamic world.²³⁸ Given the myriad factors challenging security, Saudi Arabia's main threat still emanates from Iran, its ideological and regional polar opposite. Figure 8 depicts growing Iranian influence and objectives in the Middle East.

²³⁶ David B. Ottoway, "Saudis Wield the Sword at Home as Abroad," Wilson Center, January 7, 2016, <https://www.wilsoncenter.org/publication/saudis-wield-the-sword-home-abroad>.

²³⁷ F. Gregory Gause, *Saudi Arabia in the New Middle East* (Council Special Report No. 63) (New York: Council on Foreign Relations, 2014), 16, <http://www.cfr.org/saudi-arabia/saudi-arabia-new-middle-east/p26663>.

²³⁸ Cole Bunzel, *From Paper State to Caliphate: The Ideology of the Islamic State* (U.S. Relations with the Islamic World, Analysis Paper No. 19) (Washington, DC: Brookings, March 2015), 18, <https://www.brookings.edu/wp-content/uploads/2016/06/The-ideology-of-the-Islamic-State.pdf>.

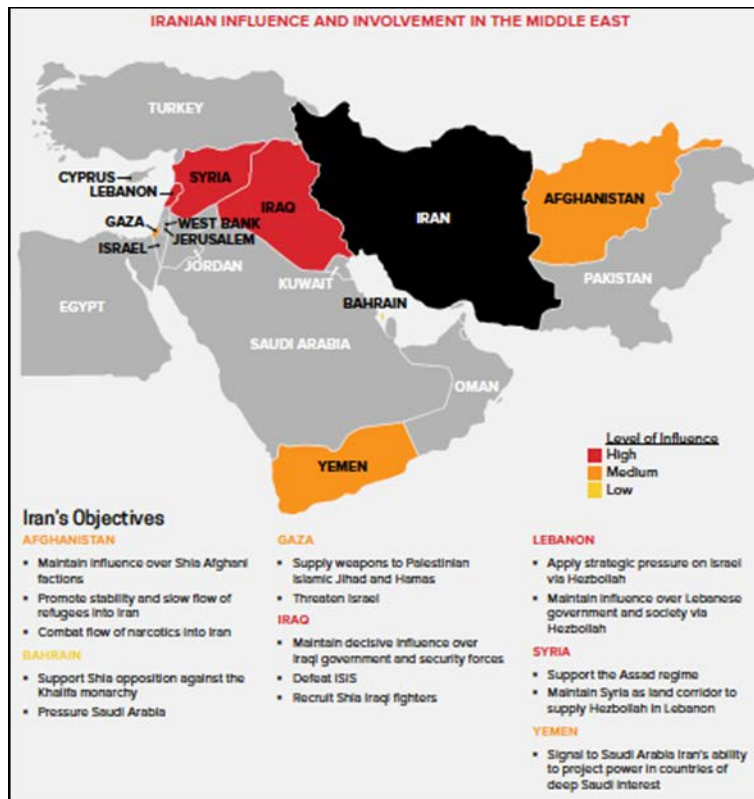


Figure 8. Iranian Influence and Involvement in the Middle East.²³⁹

Saudi Arabia invests heavily in its military while Iran remains under sanction for advanced military weapons. Its prime vendor remains the United States with military sales totaling almost \$112 billion between 2010 and 2015.²⁴⁰ In addition to seeking new tanks from the United States to replace combat losses, Saudi Arabia has ordered \$15 billion worth of armored vehicles from Canada.²⁴¹ Saudi Arabia's purchases include high-tech items such as F-15 upgrades, Apache Longbow helicopters, and Patriot missiles.²⁴²

²³⁹ Goldenberg et al., *After the Joint Comprehensive Plan*, 28.

²⁴⁰ C. Blanchard, *Saudi Arabia*, 35.

²⁴¹ David Pugliese, "Canadian Weapons Exports Reach New Levels – Saudi Arabia Largest Purchaser," *Ottawa Citizen*, December 19, 2014, <http://ottawacitizen.com/news/national/defence-watch/canadian-weapons-exports-reach-new-levels-saudi-arabia-largest-purchaser>; Idrees Ali "U.S. Approves \$1.15 Billion Sale of Tanks, Equipment to Saudi Arabia," *Reuters*, August 9, 2016, <http://www.reuters.com/article/us-usa-saudi-defense-idUSKCN10K1JR>.

²⁴² C. Blanchard, *Saudi Arabia*, 34–35.

Iran's military is in a state of recovery as it attempts to resume arms purchases after being under UN sanctions since 2007.²⁴³ These sanctions, in addition to operational use, have taken their toll on the maintenance and refurbishment of Iran's capital military equipment. This was clear when the IRGC's attempt to take Tikrit from ISIS stalled and U.S. air support was requested by Iraq to dislodge the ISIS forces.²⁴⁴ In April 2016, Iran took delivery of the S-300 air defense system from Russia.²⁴⁵ As sanctions recede, Russia seeks to be the main supplier of Iranian arms, but residual sanctions from the JCPOA complicate sales for the next five years.²⁴⁶

The numbers in Table 4 show the numeric advantage in favor of Iran. Operationally, the forces are on opposite ends of the spectrum. Through perennial engagement, Iranian forces learned to leverage asymmetric advantages to offset equipping shortages. In terms of loyalty and reliability, the Iranian military went through a purge in the wake of its 1979 revolution, and its leadership was vetted through continual engagements during the Iraq–Iran War. Saudi Arabia differs in that it possesses a relatively high-tech, well-funded, and well-maintained force that is relatively untested in battle. Recent engagement in Yemen and sorties flown in support of coalition strikes in Syria are changing this paradigm. Although technically proficient, senior Saudi officers advance through political promotion versus a meritocracy-based system to ensure fealty to the crown.²⁴⁷

²⁴³ United Nations Security Resolution 1747, March 24, 2007, https://www.iaea.org/sites/default/files/unsc_res1747-2007.pdf.

²⁴⁴ Richard Mably, Samia Nakhoul, and Ned Parker, "Iraq Request for U.S.-led Tikrit Air Strikes 'Imminent': Diplomat," *Reuters*, March 24, 2015, <http://www.reuters.com/article/us-mideast-crisis-iraq-coalition-idUSKBN0MK0XH20150324>.

²⁴⁵ Andrew Roth, "Iran Announces Delivery of Russian S-300 Missile Defense System," *Washington Post*, May 10, 2016, https://www.washingtonpost.com/world/iran-announces-delivery-of-russian-s-300-missile-defense-system/2016/05/10/944afa2e-16ae-11e6-971a-dadf9ab18869_story.html.

²⁴⁶ International Institute for Strategic Studies, "Chapter Seven: Middle East and North Africa," *The Military Balance* 116, no. 1 (2016): 327, doi:10.1080/04597222.2016.1127573.327.

²⁴⁷ Anthony H. Cordesman, *Saudi Arabia Enters the Twenty-First Century: The Military and International Security Dimensions*, vol. 2 (London: Praeger, 2003), 47.

Table 4. Iranian and Saudi Arabian Latent and Military Strength in 2016²⁴⁸

Latent Strength	<u>Iran</u>	<u>Saudi Arabia</u>	<u>+/- Diff</u>
Population	81,824,270	27,752,316	66.08%
GDP	\$397 Billion	\$632 Billion	37.19%

Military Strength	<u>Iran</u>	<u>Saudi Arabia</u>	<u>+/- Diff</u>
Manpower	523,000	227,000	66.60%
Tanks	1663	730	66.11%
Aircraft	334	325	2.7%
Surface Combatant Ships	-	7	-
Coastal Craft	69	69	0%
Submarines	29	-	-
IRBMs	-	10	-
SRBMs	18	-	-
MRBMs	22	*reported DF-21	-

In 2002, extensive nuclear activities were discovered in Iran at the Natanz and Arak facilities.²⁴⁹ This revelation and the 2003 IAEA account of Iran's failure to meet reporting standards for its nuclear activities prompted international concern that Iran was seeking nuclear weapons.²⁵⁰ Iran claimed peaceful intentions and offered it committed a simple oversight to report the beginning of enrichment. The covert nature, military dimensions, and economic infeasibility of the nuclear program led IAEA investigators to think otherwise.²⁵¹ As the story unfolded, a defector provided an Iranian laptop that had

²⁴⁸ International Institute for Strategic Studies, "Chapter Seven."

²⁴⁹ Richard Boucher, "Iranian Nuclear Facilities: Arak and Natanz (Taken Questions)," U.S. Department of State, May 9, 2003, <http://2001-2009.state.gov/r/pa/prs/ps/2003/20439.htm>.

²⁵⁰ "IAEA Verification & Monitoring in Iran: Ensuring The Peaceful Use of all Nuclear Material," International Atomic Energy Association (IAEA), accessed September 4, 2016, <https://www.iaea.org/sites/default/files/jcpoa-iaea-and-iran-infographic.pdf>.

²⁵¹ Mark Fitzpatrick, *Iranian Nuclear Crisis: Avoiding Worst-Case Outcomes* (London: Routledge, 2008), 14.

information regarding nuclear-weapon development labeled “project 111.”²⁵² The next couple of years saw a series of negotiations between Iran and France, Germany, and England to curb Iranian nuclear aspirations. These negotiations resulted in the 2004 intervention of Russia, China, and the United States in Paris during which Iran agreed to suspend enrichment.²⁵³ Iran quickly cancelled the deal, and the IAEA referred the matter to the UN Security Council. Iran remained defiant and asserted its right to peaceful nuclear enrichment. Over the next nine years, the UN Security Council drafted resolutions 1696, 1737, 1747, 1803, 1835, 1929, and 2224 to encourage Iran to abandon its nuclear program and come to the bargaining table.²⁵⁴

The need for sanction relief finally brought Iran to the bargaining table. Iran and the P5+1 nations reached an initial agreement, known as the Joint Plan of Action (JPOA), on November 24, 2013.²⁵⁵ Iran agreed to halt parts of its program, such as enrichment activities at Natanz, and rolled back others, such as diluting enriched uranium by 20 percent, in exchange for sanction relief.²⁵⁶ This plan served as a confidence-building measure that paved the way for the Joint Comprehensive Plan of Action in which Iran agreed to forgo enrichment activity for 10 years and submit to IAEA monitoring under the additional protocols of the NPT in exchange for sanction relief. The critique of this agreement is that it leaves a latent nuclear capability for Iran to resume nuclear pursuit should it elect to do so.

²⁵² Fitzpatrick, *Iranian Nuclear Crisis*, 16; Bill Gertz, “Watchdog Reveals Iran’s Nuclear Arms Work,” *Washington Times*, November 8, 2011, <http://www.washingtontimes.com/news/2011/nov/8/watchdog-reveals-irans-nuclear-arms-work/>.

²⁵³ Fitzpatrick, *Iranian Nuclear Crisis*, 34.

²⁵⁴ Kelsey Davenport, “UN Security Council Resolutions on Iran,” Arms Control Association, October 2015, <https://www.armscontrol.org/factsheets/Security-Council-Resolutions-on-Iran>.

²⁵⁵ “Joint Plan of Action (JPOA) Archive and Joint Comprehensive Plan of Action (JCPOA) Archive,” U.S. Department of the Treasury, accessed September 6, 2016, https://www.treasury.gov/resource-center/sanctions/Programs/Pages/jpoa_archive.aspx.

²⁵⁶ *Ibid.*

The JCPOA brought world powers together to discourage Iranian nuclear pursuit. Because each of these nations has disparate security and economic interests, the deal allows for snapback sanctions for which a unanimous security vote is not required. Despite these snapback sanctions, there is inherent frailty in the effort as time passes and national interests diverge. For example, Russia recently experimented with staging forces within Iran to support its efforts in Syria.²⁵⁷ The lifting of UN arms sanctions, proposed changes to the Arak reactor, and the subsequent nuclear fuel provision stand to benefit the Russian economy. Overtime, national self-interest may undermine the effort even though the deal allows for snapback sanctions.²⁵⁸

Throughout the continuing episode of the Iranian nuclear drama, Iran's leadership has displayed defiance and boisterous rhetoric that has exacerbated international fears. At one point, a misconstrued statement had President Mahmoud Ahmadinejad advocating that Israel be "wiped off the map."²⁵⁹ Adding to the international concern was Iran's continual procurement activities; in 2006, Undersecretary Joseph blamed the Proliferation Security Initiative (PSI) for stopping procurement of missile and heavy-water equipment.²⁶⁰ The Iranian defiance of its agreements under the NPT, coupled with the ambiguity of the Iranian nuclear program, compounded by the continual procurement attempts of nuclear and missile materials, adds up to a threat that points to Iran's eventual nuclearization. Proxy engagement with Iran coupled with the fact that Saudi Arabia is

²⁵⁷ Neil Macfarquhar and David E. Sanger, "Russia Sends Bombers to Syria Using Base in Iran," *New York Times*, August 16, 2016, http://www.nytimes.com/2016/08/17/world/middleeast/russia-iran-base-syria.html?_r=0.

²⁵⁸ Goldenberg et al., *After the Joint Comprehensive Plan*, 28.

²⁵⁹ Glenn Kessler, "Did Ahmadinejad Really Say Israel Should Be 'Wiped off the Map'?" *Washington Post*, October 5, 2011, https://www.washingtonpost.com/blogs/fact-checker/post/did-ahmadinejad-really-say-israel-should-be-wiped-off-the-map/2011/10/04/gIQABJKML_blog.html.

²⁶⁰ Mary Beth Nikitin, *Proliferation Security Initiative (PSI)* (CRS Report No. RL34327) (Washington, DC: Congressional Research Service, 2012), 3, <https://www.fas.org/sgp/crs/nuke/RL34327.pdf>.

well within the range of its Shahab series of missiles establishes a nuclear Iran as a major security challenge to the Kingdom.²⁶¹

Today, Saudi Arabia maintains a wait-and-see attitude regarding Iranian compliance with the JCPOA. To say the relations between the two nations are at a nadir is an understatement. The recent Iranian storming and burning of a Saudi Arabian Embassy in the aftermath of the Kingdom's execution of a Shia cleric and the persistent proxy military engagement has led to an intense security rivalry throughout the region.

1. Tenuous Alliances as an Offset to Nuclear Acquisition

This section explores Saudi Arabia's relationship with its two nuclear allies, the United States and Pakistan, and how the strength of those alliances may help to determine whether the Kingdom stops at nuclear hedging or moves toward acquiring a nuclear weapons capability. The U.S.–Saudi relationship shows how the security partnership has survived periods of intense friction to maintain a lasting informal alliance based on converging mutual interests. If Saudi Arabia feels it is unable to offset Iran through its traditional partnership with the United States, there is the option to turn to its other nuclear ally, Pakistan. This section begins with a review of U.S.–Saudi relations and concludes with a review of the speculation regarding a Saudi–Pakistani nuclear arrangement.

The United States is one of the Kingdom's oldest allies. The friendship between the nations grew through mutual oil exploitation and U.S. economic relief during World War II. Franklin Delano Roosevelt and King Ibn Saud cemented this relationship during the first head of state meeting between the two countries aboard the U.S.S. *Quincy* in 1945.²⁶² During the visit, the two men discussed the post-war plight of the Jews,

²⁶¹ John R. Haines, "Foreseeable, Foreseen, Ignored: Is Iran Advancing Its Missile Program at Home while Offshoring Its Nuclear Program to North Korea?" Foreign Policy Research Institute, January 11, 2016, <http://www.fpri.org/article/2016/01/foreseeable-foreseen-ignored-is-iran-advancing-its-missile-program-at-home-while-offshoring-its-nuclear-program-to-north-korea/>.

²⁶² Thomas W. Lippman, "The Day FDR Met Saudi Arabia's Ibn Saud," *The Link* 38 no. 2 (2005): 3, <http://www.ameu.org/getattachment/51ee4866-95c1-4603-b0dd-e16d2d49fcbc/The-Day-FDR-Met-Saudi-Arabia-Ibn-Saud.aspx>.

culminating in a promise that the United States would take no action without consultation with Saud.²⁶³ President Harry S. Truman quickly reversed FDR's position and recognized Israel. While the king was greatly disappointed, the relationship survived. After the creation of Israel, Saudi Arabia permitted the United States to use the Dhahran airfield through the 1949 Dhahran Airfield Agreement.²⁶⁴ The Mutual Defense Agreement signed on June 18, 1951 quickly followed this agreement.²⁶⁵ This agreement created the U.S. military training and assistance mission in Saudi Arabia and formalized further military assistance. The Kingdom viewed the Soviet Union, Iraq, and Jordan as its biggest threats and believed that the strong bilateral relations with the United States provided the necessary offset to ensure future security.²⁶⁶ This mixture of threats led to Saudi Arabia abstaining from joining the Central Treaty Organization and continuing to rely on bilateral security arrangements.

The U.S.–Saudi relationship experienced its first major rift with the 1973 Arab–Israeli War. President Nixon promised the Saudis that he would remain neutral in Israeli–Arab relations and then promptly pushed a \$2.2 billion aid package through congress for Israel.²⁶⁷ This prompted Saudi Arabia and other nations among the Organization of Petroleum Exporting Countries (OPEC) to initiate an oil embargo against the United States and its allies, which drastically inflated oils prices until 1974. This event highlights Saudi Arabia's willingness to part from the United States in pursuing its own interests.

The Arab world often sees the Soviet occupation of Afghanistan as a U.S. failure to thwart communism at the expense of an Islamic nation. This prompted the issuance of

²⁶³ Lippman, "FDR Met Ibn Saud," 9.

²⁶⁴ United States Department of State, "890F.7962/7–2049: The Chargé in Saudi Arabia (Bergus) to the Secretary of State," in *The Near East, South Asia, and Africa*, Foreign Relations of the United States, 1949, ed. the Historical Office, vol. VI (Washington, DC: Government Printing Office, 1977), <https://history.state.gov/historicaldocuments/frus1949v06/d1119>.

²⁶⁵ "Treaties in Force: A List of Treaties and Other International Agreements of the United States in Force on January 1, 2013," U.S. Department of State, accessed August 22, 2016, 255, <http://www.state.gov/documents/organization/218912.pdf>.

²⁶⁶ Lippman, "FDR Met Ibn Saud," 35.

²⁶⁷ Long, *Ambivalent Allies*, 24.

the Carter Doctrine in which President Carter proclaimed during a State of the Union address that the United States would use force if necessary to counter military aggression in the Gulf region.²⁶⁸

The fall of the Shah and the commencement of the Iran–Iraq War in 1980 changed the security dynamic for Saudi Arabia. Ayatollah Khomeini’s revolution in Iran raised concerns for Saudi Arabia on two fronts: the rise of an ideologically opposed nation that would challenge the regional status quo and the fear that revolution would spread to other governments. Iraq’s immediate engagement of Iran provided an immediate counterbalance. During the war, Saudi Arabia backed Iraq. Saudi support was not just limited to countering Iran; when Israel bombed Iraq’s Osirak nuclear facilities, the Kingdom offered to pay to rebuild the damaged Iraqi facilities.²⁶⁹ This support did not come without risk; Iran threatened the oil tankers by mining and blockading the Persian Gulf. The United States was quick to mobilize the Carter Doctrine in justifying the protection of Kuwaiti and Saudi shipping from the Iranians. During the Iran–Iraqi War, Saudi Arabia took advantage of the preoccupation of Iraq and Iran and began to assert itself as a regional power. It departed from bilateral security arrangements and assumed a growing role within the emerging Gulf Cooperation Council.²⁷⁰

After Iraq invaded Kuwait, the United States assembled a coalition to liberate Kuwait in what was to become Operations Desert Shield and Desert Storm. This was a departure for Saudi Arabia; it was forced to accommodate the presence of Western forces on the soil of the holy land. The presence of Western troops also called the Kingdom’s legitimacy into question regarding its role as protector of the *Umma*. Al Qaeda often cites this presence in its narrative of the Saudi royal family placating Western incursion. Post-9/11 tensions escalated between the nations when 15 of the 19 hijackers were identified

²⁶⁸ Jimmy Carter, “The State of the Union Address Delivered before a Joint Session of the Congress,” Washington, DC, January 23, 1980, accessed September 4, 2016, <http://www.presidency.ucsb.edu/ws/?pid=33079>.

²⁶⁹ Anthony H. Cordesman, *The Military Balance in the Middle East* (London: Praeger, 2004), 522.

²⁷⁰ Mabon, *Saudi Arabia and Iran*, 55–56.

as Saudi citizens. When the 2003 invasion of Iraq took place, the Saudis were quick to disapprove the effort, highlighting that disposing Hussein would favor Iran by disrupting the regional status quo. These events mark another low point in U.S.–Saudi relations.

During the process leading to the JCPOA, the Saudis felt betrayed by the United States’ desire to conclude an agreement with Iran at the cost of their security.²⁷¹ The Kingdom shared its displeasure with the United States and engaged in a rhetoric of “whatever they have, we’ll get.” Immediately after the signing of the JCPOA, the United States sent high-level delegations, including Secretary of Defense Ash Carter and Secretary of State John Kerry, to reassure the Saudis of U.S. security commitments.²⁷²

Today, the United States maintains a full court press to reassure its Gulf allies. The United States has increased arms sales to Saudi Arabia and currently provides military assistance to Operation Restoring Hope in Yemen. The U.S. support to this operation is premised on the need to show support for Saudi Arabia and not necessarily on the merit of the effort.²⁷³ The United States and the GCC engaged in security summits in 2015 and 2016 to come to a tepid agreement on collective defense.²⁷⁴ As a result, the Saudi government snubbed President Obama during his official visit to Saudi Arabia by having the governor of Riyadh receive him vice the King himself.²⁷⁵ Despite the snub, the continued arms support to Saudi Arabia in light of alleged human rights violations in

²⁷¹ Joseph Bahout et al., “Saudi Arabia’s Changing International Role,” Carnegie Endowment for International Peace, April 18, 2016, <http://carnegieendowment.org/2016/04/18/saudi-arabia-s-changing-international-role-pub-63366#impact>.

²⁷² Phil Stewart, “U.S. Defense Chief in Saudi Arabia to Reassure after Iran Deal,” *Reuters*, July 22, 2015, <http://www.reuters.com/article/us-iran-nuclear-us-saudi-idUSKCN0PW0TA20150722>; Michael R. Gordon, “John Kerry, in Saudi Arabia, Reassures Gulf States on Iran Nuclear Talks,” *New York Times*, March 5, 2015, <http://www.nytimes.com/2015/03/06/world/middleeast/john-kerry-in-saudi-arabia-reassures-gulf-states-on-iran-nuclear-talks.html>.

²⁷³ Mark Mazzetti and Eric Schmitt, “Quiet Support for Saudis Entangles U.S. in Yemen,” *New York Times*, March 13, 2016, http://www.nytimes.com/2016/03/14/world/middleeast/yemen-saudi-us.html?_r=0.

²⁷⁴ Bahout et al., “Saudi Arabia’s Changing International Role.”

²⁷⁵ Dave Boyer, “Saudis Deliver Snub to Obama amid Tensions over Iran, Syria,” *Washington Times*, April 20, 2016, <http://www.washingtontimes.com/news/2016/apr/20/obama-grateful-saudi-kings-hospitality/>.

Yemen proves that the Obama administration is willing to bridge the gap between the nations.²⁷⁶

Pakistan represents an alternative approach to Saudi security challenges. Some observers argue that Saudi Arabia will simply buy a weapon or perhaps lease a nuclear umbrella from Pakistan to counter Iran. Rumors of secret deals between Pakistan and Saudi Arabia abound. The commonly cited proof is Saudi Arabia's financial aid to Pakistan during its development of the "Islam bomb."²⁷⁷ The next key piece cited is Saudi Prince Sultan's visit to Kahuta and the ensuing rumors that he toured non-safeguarded Pakistani nuclear-weapon facilities.²⁷⁸ Strengthening the theory is the Saudi Arabian provision of oil when post-nuclear sanctions hit Pakistan the hardest. The recent attendance by the Pakistani Chief of Army Staff at the Saudi public parade, displaying the 1986 Saudi purchase of Chinese CSS-2 missiles, fuels this speculation.²⁷⁹

The counter argument is that Pakistan is not at the beck and call of Saudi Arabian whims and remains leery of further international sanctions. In 2014, when Saudi Arabia called on its partners to help intervene in Yemen, Pakistan politely refused.²⁸⁰ There was an extrapolation of the Pakistani approach to Yemen applied to the Saudi-Pakistani relationship regarding potential nuclear deals; very few sources mention that the Pakistani military was also decisively engaged in an anti-terror campaign in its Federally Administered Tribal Areas.

²⁷⁶ Bruce Riedel, "Is Selling Tanks to Saudi Arabia Such a Good Idea?" *The National Interest*, August 11, 2016, <http://nationalinterest.org/feature/selling-tanks-saudi-arabia-such-good-idea-17323>.

²⁷⁷ Levy and Scott-Clark, *Deception*, 20.

²⁷⁸ Simon Henderson, "Nuclear Nuances of Saudi-Pakistan Meeting," *Washington Institute*, February 3, 2015, <http://www.washingtoninstitute.org/policy-analysis/view/nuclear-nuances-of-saudi-pakistan-meeting>.

²⁷⁹ Simon Henderson, "Saudi Arabia's Missile Messaging," *Washington Institute*, April 29, 2014, <http://www.washingtoninstitute.org/policy-analysis/view/saudi-arabias-missile-messaging>. The CSS-2 is a near obsolete but once staple missile of the Chinese nuclear forces.

²⁸⁰ Tim Craig, "Defying Saudis, Pakistani Lawmakers Vote to Stay out of Yemen," *Washington Post*, April 10, 2015, https://www.washingtonpost.com/world/2015/04/10/6dc494fc-df62-11e4-a500-1c5bb1d8ff6a_story.html.

The truth is that no one can confirm or deny the secret Pakistani–Saudi theory. The irony of the theory is that Saudi Arabia seeks protection from Iran through Pakistan, a nation that through its national hero, A. Q. Khan, assisted Iranian nuclear efforts via its illicit smuggling ring. Saudi Arabia would have to weigh consequences of such a deal or alliance as it could come at the expense of American relations that supply a steady stream of arms for current fights against Iranian proxies.

D. DOMESTIC FACTORS

Determining domestic factors in Saudi Arabia from the three nuclear communities presents a challenge because of the opacity of the decision-making cycle of the royal family, the nature of the Saudi military, and the scientific community's diminutive stature. This section looks at these decision-making communities from the Saudi perspective and concludes by reviewing Saudi rhetoric regarding nuclear weapons.

Saudi Arabia is an absolute monarchy with the Quran as its constitution under the Basic Law of 1992. An appointed national Shura, or advisory council, whereby citizens appointed by the monarchy advise and oversee select governmental functions.²⁸¹ There are thousands of Saudi princes but very few exercise political sway with the King, and only his inner circle wields true decision-making authority. This inner circle usually includes the crown prince, the deputy crown prince, and the ministers of defense and interior. Other key positions include the Saudi ambassador to the United States and the United Kingdom. King Salman's recent ascension to the throne and his subsequent rearrangement of the court complicates insight into this decision-making process. King Salman recently consolidated power by entrusting Crown Prince Mohammed bin Nayef with the newly formed council for political and security affairs and empowering Deputy Crown Prince Mohammed bin Salman with the council for economic and developmental affairs.²⁸² Upon assuming the throne, King Salman also named his son, Mohammed bin Salman, the deputy crown prince over the current deputy, Prince Murqin. Since Prince

²⁸¹ C. Blanchard, *Saudi Arabia*, 4.

²⁸² *Ibid.*, 6.

Mohammed bin Salman assumed his position, he has spearheaded rapid economic reform in his efforts to privatize the oil industry and shape long-term economic policy. Norman Cigar is apt in describing the Saudi monarchy as the monolithic “State” in the realist construct.²⁸³

The Saudi military is inherently loyal in design, the defense minister is the crown prince, and personnel who display fealty to the King fill key military billets.²⁸⁴ The military is apolitical for the most part and is not a policy maker in the Saudi decision cycle. Intriguingly, Prince Mohammed bin Salman, the minister of defense, serves as the vice-chairman on the supreme council of the King Abdullah City for Atomic and Renewable Energy (KACARE).²⁸⁵ The king established KACARE in 2010 as an ongoing effort to explore nuclear energy for Saudi Arabia’s ambitious nuclear energy plan.

The nuclear scientific community is relatively nascent in Saudi Arabia. The Saudi government is seeking training opportunities abroad to develop the intellectual capital required to produce and maintain an atomic energy program. In 2013, in conjunction with a state visit to Riyadh by French President Francois Hollande, the French company Areva, known for its reprocessing efforts in Japan and China, signed a memorandum of agreement to train five Saudi businesses in the skills necessary for developing an atomic energy program.²⁸⁶

Saudi Arabia does not have an internal bomb lobby such as that formed by Zulfiqar Bhutto and Munir Khan in Pakistan. Its politics has left a trail of ambiguity, which has set up a system reactive to Iranian overtures. In terms of political influence, Deputy Crown Prince Mohammed bin Salman is the actor to watch as some think he may

²⁸³ Cigar, *Saudi Arabia and Nuclear Weapons* (New York: Routledge, 2016), 16.

²⁸⁴ Cordesman, *Saudi Arabia Enters the Twenty-First Century*, 47.

²⁸⁵ “The Establishing Order,” King Abdullah City for Atomic and Renewable Energy, accessed September 6, 2016, <https://www.kacare.gov.sa/en/about/Pages/royalorder.aspx>.

²⁸⁶ “Areva and EDF Sign Two Series of Agreements with Companies and Universities for The Saudi Nuclear Program,” Areva, December 13, 2013, <http://www.areva.com/EN/news-10102/areva-and-edf-sign-two-series-of-agreements-with-companies-and-universities-for-the-saudi-nuclear-program.html>.

be the next king.²⁸⁷ He presides over defense and, as such, he is the co-chairman of KACARE.²⁸⁸ His attitudes and beliefs are paramount to the direction the future Saudi nuclear infrastructure takes.

With absolute power residing in the monarchy, analyzing the interaction within the three traditional nuclear demand communities remains a challenge. If the Saudis are interested in nuclear pursuit, the arrangement is supportive as the military and Saudi scientific enterprises are subservient to the monarchy. Looking at the Saudi paradigm from the “nuclear mythmaking” perspective provides some limited insight. Since 2006, the Saudi family has its share of mythmakers that litter the landscape. Figure 9 depicts a sample of some of the popular public statements since 2006. In regards to emphasizing insecurities, the Saudis are quick to point out the vulnerabilities left by Iranian and Israeli nuclearization. Prince Muqrin’s statement in 2006 highlights the dangers of Israel’s arsenal while King Abdullah’s blunt statement makes it a foregone conclusion that the Kingdom will follow Iran’s lead should it pursue a weapon. In the recent years, Prince Turki Al Faisal has been quick to point out the need to counter the Iranian nuclear threat to the GCC. Al Faisal has also made statements that link Saudi nuclear-energy development to a strategy to offset Iran, but this is outside his tenure of official duties.²⁸⁹ Since the JCPOA, the banter has died down, from seeking weapons if Iran broke out to matching residual enrichment capabilities.²⁹⁰ There is a progression through the cycle, but to what end is uncertain. Since King Salman’s ascension, a reshuffling of the royal family and consolidation of power has made discerning the Kingdom’s intent even more difficult. Complicating public understanding even further is the monarchy’s extensive

²⁸⁷ Guy Taylor, “Prince Mohammed bin Salman Being Groomed to Jump Succession Line, Claim Saudi Throne,” *Washington Times*, May 1, 2016, <http://www.washingtontimes.com/news/2016/may/1/prince-mohammed-bin-salman-of-saudi-arabia-being-g/>.

²⁸⁸ “The Establishing Order,” King Abdullah City.

²⁸⁹ Drollette, “View from the Inside,” 22.

²⁹⁰ David E. Sanger, “Saudi Arabia Promises to Match Iran in Nuclear Capability,” *New York Times*, May 13, 2015, <http://www.nytimes.com/2015/05/14/world/middleeast/saudi-arabia-promises-to-match-iran-in-nuclear-capability.html>.

control over the media. The Kingdom frequently demonstrates its ability to arrest journalists for not reporting in line with the royal interest.²⁹¹ This tight media control undermines the objectivity of Saudi media and leaves one to wonder whether they are reporting information or disinformation. Perhaps Abel Al-Jubier summarizes the normative state of Saudi Arabia, when he offers, “Saudi Arabia will do whatever it takes.”²⁹²

²⁹¹ Cigar, *Saudi Arabia and Nuclear Weapons*, 28.

²⁹² Fantz, “Saudi Foreign Minister Deeply Skeptical.”

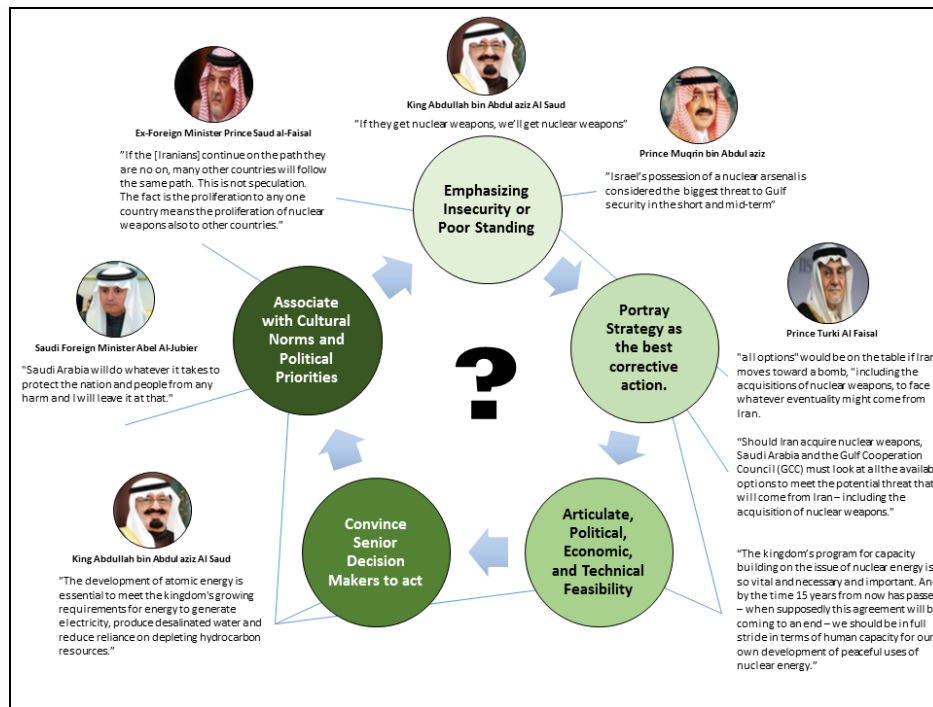


Figure 9. Lavoy's Cycle of Mythmaking Overlaid with Saudi Statements²⁹³

The lessons of Pakistan and Japan point to specific individuals who have pushed the need for nuclear development. Zulfikar Bhutto pushed the Pakistani atomic energy community from nuclear-weapon exploration to pursuit in 1974. Prime Minister Eisaku Sato pushed for the 1968/70 Report, which underwrote its nuclear hedging strategy. Tough and ambiguous talk emerged from King Abdullah in the run-up to the JCPOA, but King Salman's inner circle has been relatively mute since endorsing the deal. Considering Deputy Crown Prince Mohammed Bin Salman's position to defense and as vice-chairman of KACARE, he will remain the individual to watch in regards to nuclear ambitions.

²⁹³ Lavoy, "Nuclear Proliferation over the Next Decade," 435; Drollette, "View from the Inside," 22; Fahd Al-Dhiyabi, "Saudi Al-Faysal: The Syrian People Must be Empowered to Defend Themselves, and Iran is Not Sincere about Its Nuclear Program," *Al-Sharq Al-Awsat*, February 13, 2013 as cited in Cigar, *Saudi Arabia and Nuclear Weapons*, 81; Fantz, "Saudi Foreign Minister Deeply Skeptical"; Al-Amir Murqin, "Prince Murqin: Ideological Conflicts and Nuclear Arms Acquisitions Threaten Security in the Gulf," *Ukaz*, December 9, 2006, www.okaz.com.sa as cited in Cigar, *Saudi Arabia and Nuclear Weapons*, 40; Chemi Shalev, "Dennis Ross: Saudi King Vowed to Obtain Nuclear Bomb after Iran," *Haaretz*, May 30, 2012, <http://www.haaretz.com/israel-news/dennis-ross-saudi-king-vowed-to-obtain-nuclear-bomb-after-iran-1.433294>.

1. Technological Hurdles to a Credible Hedge

If Saudi Arabia hopes to compete with Iran, it will have to compete with a nuclear program that began under the Shah through the U.S. Atoms for Peace program. Saudi Arabia faces the daunting task of building a capability from absolute zero in nuclear scientific work force and infrastructure. While many, such as Zakaria, place this beyond the grasp of the Kingdom, others counter with the fact that the United States produced a bomb in five years. This section explores the steps the Saudis have taken toward nuclearization since 2006 and ends by reviewing its strategic missile forces.

The state of the Saudi Arabia's nuclear structure is aspirational. It comprises grand plans to offset future energy shortfalls but little progress. Initially, Saudi Arabia approached nuclear energy as part of a broader effort with Gulf partners: Kuwait, Bahrain, the United Arab Emirates (UAE), Qatar, and Oman. The partners enlisted the aid of the French, and even Iran offered to help develop this effort.²⁹⁴ In 2009, the Saudis established KACARE under royal decree of King Abdullah under the auspices of relieving the nation of its petrochemical dependency.²⁹⁵ Also in 2009, the Saudis enlisted the aid of the Swedish firm Pöyry to create a national strategy for KACARE that harnesses nuclear and other nonrenewable energy in both the short and long term.²⁹⁶ Technically, this is not a new effort as Saudi atomic research dates back to 1977 through the King Abd Al-Aziz Center for Science and Technology (KAACST).²⁹⁷

²⁹⁴ "Nuclear Power in Saudi Arabia," World Nuclear Association.

²⁹⁵ "The Establishing Order," King Abdullah City.

²⁹⁶ Pöyry PLC, "Pöyry Awarded Nuclear and Renewable Energy Strategy Project in Saudi Arabia" (press release), June 10, 2010, <http://www.poyry.com/news/poyry-awarded-nuclear-and-renewable-energy-strategy-project-in-saudi-arabia>.

²⁹⁷ "Saudi Arabia," Nuclear Threat Initiative, accessed August 8, 2016, <http://www.nti.org/learn/countries/saudi-arabia/nuclear/>.

In 2011, Saudi Arabia announced an ambitious plan to build 16 reactors by 2040.²⁹⁸ In its pursuit of nuclear energy, Saudi Arabia has concluded nuclear agreements with Pakistan, the United States, the United Kingdom, China, Russia, Ukraine, Kazakhstan, Argentina, France, and South Korea to develop nuclear infrastructure and build these 16 nuclear energy reactors.²⁹⁹ The current plan under the 2030 Saudi Vision seeks roughly \$80 billion to build the nuclear infrastructure.³⁰⁰ Saudi Arabia's ambitious goals project it having the first reactor running by 2022. However, a Saudi–Argentinian joint venture was due to break ground this year but failed to materialize.³⁰¹ The lack of urgency belies any Saudi urgency to compensate Iran's progress.

The biggest shortage the Saudis face in establishing a nuclear program is human capital. Investment in science, technology, engineering, and mathematics (STEM) education has been lacking, and those who pursue higher education in STEM fields find that job opportunities within the Kingdom are nil.³⁰² The unpopularity of nuclear research in Saudi Arabia has led to budget cuts and discouraged others from pursuing careers within the field.³⁰³ Efforts to change the course have yet to take hold; efforts include industrial exchanges and internships with companies such as Areva opening local offices in Riyadh to train the local workforce.³⁰⁴ In the case of the U.S. endeavor to pursue nuclear weapons, the United States mobilized its national brain trust, albeit with help from displaced immigrants, to produce a bomb rapidly. A Saudi Arabian effort would have to build or recruit the brain trust to start. Prince Turki al-Faisal has

²⁹⁸ Sara Anabtawi, "Saudi Plans to Build 16 Nuclear Reactors by 2030," *Reuters*, June 1, 2011, <http://www.reuters.com/article/saudi-nuclear-idAFLDE75004Q20110601>.

²⁹⁹ Cigar, *Saudi Arabia and Nuclear Weapons*, 129; "Nuclear Power in Saudi Arabia," World Nuclear Association.

³⁰⁰ "Nuclear Power in Saudi Arabia," World Nuclear Association.

³⁰¹ *Ibid.*

³⁰² Cigar, *Saudi Arabia and Nuclear Weapons*, 91.

³⁰³ *Ibid.*

³⁰⁴ "Saudi Arabia: Areva and EDF Open a Branch Office in Riyadh," Areva, June 12, 2012, <http://www.areva.com/EN/actualites-9376/arabie-saoudite-areva-et-edf-ouvrent-un-bureau-commun-a-riyad.html?xtmc=Arabie%20Saoudite&xtcr=1>.

recognized the gap in human capital and asserts that Saudi Arabia's plan to develop nuclear energy will bring his country along just as the JCPOA expires.³⁰⁵

In light of the success that Iran and Iraq had with missile attacks against each other in the 1980s, Saudi Arabia sought a missile capability itself to serve as a deterrent against future attacks. Initially rebuffed by the United States, Saudi Arabia purchased Chinese CSS-2 missiles and subsequently established the Saudi Strategic Missile Force.³⁰⁶ As recent as 2013, reports emerged of the Saudis upgrading their missiles to DF-21s with a recent parade displaying possible support equipment.³⁰⁷ While both the CSS-2 and DF-21 have nuclear variants, reports have emerged that the variants purchased by the Saudis are not nuclear capable. The importance of the Saudi missile force is the established command structure it represents should Saudi Arabia pursue nuclear weapons.

2. Economic Factors

The Saudi Arabian government seeks to implement economic reforms under its "Vision 2030," which includes diversifying its industrial base away from oil, developing the investment sector, and serving as connector for European-Asian-African trade.³⁰⁸ It is a relatively vulnerable time for Saudi Arabia as it seeks to increase its market share in oil exports, deny Iran a market share, wage war in Yemen, counter Iranian influences, and reform its economy. This section briefly explores the implications of Saudi oil policy and the goals of economic reform.

Once a swing producer of oil that valued price stability over short-term profit, the current situation forces Saudi Arabia to overproduce to deny Iran increased profits from reentry into the oil market. Recently, Saudi Arabia has derailed oil production freeze

³⁰⁵ Drollette, "View from the Inside," 22.

³⁰⁶ Ala Alrababah and Jeffrey Lewis, "Saudi Rattles Its Saber," Nuclear Threat Initiative, December 15, 2014, <http://www.nti.org/analysis/articles/saudi-rattles-its-saber/>.

³⁰⁷ Henderson, "Saudi Arabia's Missile Messaging."

³⁰⁸ "Vision 2030," Kingdom of Saudi Arabia, accessed September 6, 2016, <http://www.vision2030.gov.sa/en/node>.

levels unless Iran agrees to the same.³⁰⁹ Saudi Arabia has long taken to a stance of not using oil as a weapon, but this episode and the 1973 oil embargo clearly demonstrate to the contrary. This episode also provides insight into what would happen if roles reversed and Saudi Arabia was under international scrutiny for nuclear pursuit. Oil is the current engine of the Saudi economy; if Saudi Arabia were to receive international sanctions for suspected nuclear pursuit, international sales may swing to its rival Iran and stifle Saudi economic reform.

Saudi energy diversification provides a reasonable rationale for government investment in renewable energy such as in solar and nuclear sectors. The projected goals of 2030 that seek to shift oil for export and manufacturing use versus national consumption supports this ambitious alternative energy strategy. Financial experts, such as Citigroup, predict that if Saudi Arabia does not curb domestic consumption of oil, it could become a net oil importer by 2030.³¹⁰ Saudi Arabia seeks to produce 9.5 gigawatts of renewable power by 2030 to balance its energy industry. The development of 16 reactors support this concept.

Saudi Arabia's "Vision 2030" also declares national intent to develop a domestic defense manufacturing industry. It cites a goal of shifting the imbalance of its two-percent domestic production to an ambitious goal of 50 percent.³¹¹ Saudi Arabia seeks to transform its existing military industrial base from parts supply to more advanced items such as aircraft.³¹² Much like Pakistan, it seeks technology transfers to enable self-reliance.

As Prince Mohammed bin Salman seeks to guide his country through these ambitious transformations, he takes on significant national debt. Recently, Saudi Arabia

³⁰⁹ John Kemp, "Saudi Arabia Turns Oil Weapon on Iran: Kemp," *Reuters*, April 18, 2016, <http://www.reuters.com/article/us-oil-meeting-kemp-idUSKCN0XF2AR>.

³¹⁰ Ayesha Daya and Dana El Baltaji, "Saudi Arabia May Become Oil Importer by 2030, Citigroup Says," *Bloomberg*, September 4, 2012, <http://www.bloomberg.com/news/articles/2012-09-04/saudi-arabia-may-become-oil-importer-by-2030-citigroup-says-1->.

³¹¹ "Vision 2030," Kingdom of Saudi Arabia.

³¹² *Ibid.*

has sought more than \$8 billion in loans from international lenders.³¹³ It further plans an unprecedented bond sale of \$15 billion in late 2016.³¹⁴ The Kingdom ventured to offer up to five percent of Saudi Aramco to the public in a forthcoming IPO with an unprecedented expected value of \$150 billion.³¹⁵ Some attribute the Kingdom's onboarding of debt and drastic changes to the oil crash, which depleted Saudi Arabia's \$100 billion surplus, as proof positive of a crumbling oil economy. A counter argument is that Saudi Arabia is all in for its "Vision 2030." The implications of recent economic developments are that they establish a credible backdrop for its increased investment in nuclear energy while increasing foreign development interests that may make global leaders think twice before sanctions should Saudi Arabia experiment in nuclear pursuits.

E. INTERNATIONAL REGIMES

Saudi Arabian attitudes toward nonproliferation mirror Pakistan's initial approach in the 1970s toward India in that both countries view nonproliferation regimes as useful only if they generate security advantages. For example, Saudi Arabia sought a position of parity with Israel and agreed to sign the NPT as soon as Israel did.³¹⁶ The Saudis had to abandon this approach after they purchased Chinese CSS-2 missiles. The United States highlighted to Prince Bandar that the purchase made Saudi Arabia a pronounced threat to Israel and subject to attack should war erupt in the Middle East.³¹⁷ The purchase has also

³¹³ Nicolas Parasie, "Saudi Arabia Seeks Loan of as Much as \$8 Billion," *Wall Street Journal*, March 10, 2016, <http://www.wsj.com/articles/saudi-arabia-seeks-to-raise-up-to-8-billion-loan-1457534170>.

³¹⁴ Matt Egan, "Saudi Arabia Plans \$15 Billion Bond Sale to Raise Cash," *CNN*, May 31, 2016, <http://money.cnn.com/2016/05/31/investing/saudi-arabia-first-bond-sale-ever/>.

³¹⁵ Maureen Farrell and Nicolas Parasie, "Saudi Aramco IPO: The Biggest Fee Event in Wall Street History," *Wall Street Journal*, June 9, 2016, <http://www.wsj.com/articles/saudi-aramco-ipo-wall-streets-white-whale-1465464606>.

³¹⁶ Thomas W. Lippman, "Saudi Arabia: The Calculations of Uncertainty," in *The Nuclear Tipping Point: Why States Reconsider Their Nuclear Choices*, ed. Kurt M. Campbell, Robert J. Einhorn, and Mitchell B. Reiss (Washington, DC: Brookings, 2004), 111.

³¹⁷ *Ibid.*, 114.

had downstream effects on pending U.S.–Saudi arms purchases; to assuage anger in Washington and put U.S.–Saudi arms deals back on track, King Fahd signed the NPT.³¹⁸

Since joining the Nonproliferation Treaty in 1988, Saudi Arabia endorsed several nonproliferation and counter-proliferation initiatives such as the Global Initiative to Combat Nuclear Terrorism and the Proliferation Security Initiative.³¹⁹ Saudi Arabia concluded the comprehensive safeguards agreement in 2009 and signed a small quantities protocol (SQP). The United States and the European Union argued against signing the SQP because it allowed the Kingdom to take advantage of a 1970s-era regime that was not as restrictive and exempted many inspection requirements.³²⁰ To date, Saudi Arabia has not signed the additional protocol that Iran agreed to under the JCPOA. This will be a revisited issue when Saudi Arabia goes to put its energy plan into effect.

Saudi Arabia has been vocal about extending a nuclear weapon–free zone throughout the Middle East. Once again, this is an attempt to improve its security by denying others what the Saudis do not have. It has been part of a proposal to the UN as recently as 2013 calling for a “Middle East Free from Nuclear Weapons and all other Weapons of Mass Destruction.”³²¹ This is one area in which both Iran and Saudi Arabia find congruence to apply pressure on Israel and its undeclared nuclear arsenal.

For the most part, Saudi Arabia is an upstanding member of the nonproliferation community. It is pragmatic in its approach to nonproliferation and advocates enforcing

³¹⁸ Thomas W. Lippman, “Nuclear Weapons and Saudi Strategy,” (Policy Brief No. 5) (Washington, DC: Middle East Institute, 2008), 3, https://www.files.ethz.ch/isn/55946/No_05_Nuclear_Weapons_and_Saudi_Strategy.pdf.

³¹⁹ “Proliferation Security Initiative,” U.S. Department of State, accessed September 6, 2016, <http://www.state.gov/t/isn/c10390.htm>; “The Global Initiative to Combat Nuclear Terrorism,” U.S. Department of State, accessed August 23, 2016, <http://www.state.gov/t/isn/c18406.htm>.

³²⁰ Olli Heinonen and Simon Henderson, “Nuclear Kingdom: Saudi Arabia’s Atomic Ambitions,” Washington Institute for Near East Policy, March 27, 2014, http://belfercenter.ksg.harvard.edu/publication/24061/nuclear_kingdom.html.

³²¹ “Middle East Weapons of Mass Destruction Free Zone,” United Nations, accessed August 23, 2016, <https://www.un.org/disarmament/menbcletters/>.

the existing rules and laws concerning proliferation.³²² Stated another way, Saudi Arabia does not actively seek any agreements that limit future nuclear decision-making to “do whatever it takes” regarding its security.

F. CONCLUSION: A HEDGE ONLY IF, WHEN, AND HOW IT IS BUILT

The implication of an eventual nuclear Iran coupled with a Saudi Arabia currently engaging Iranian-backed Houthis on its border clearly establishes a threat to Saudi Arabia. The monarchy’s “whatever they have, we’ll have,” position in the aftermath of the JCPOA underscores the Saudi Arabian urge to compensate. Unfortunately, the Saudis lack the technological capability to compete. Saudi Arabia’s lack of a technical base, particularly its malnourished STEM community, hampers its efforts and has a downstream effect on its desires to build a competing nuclear infrastructure. Its years of scientific underdevelopment preclude it from rapidly establishing the indigenous capability to produce nuclear weapons in a relatively short period as demanded by a nuclear hedging strategy. The best it can hope to do is build the technical base proposed in “Vision 2030,” which may establish a nascent capability to hedge. Figure 10 depicts that despite a high threat from Iran, Saudi technological capabilities hinder its progression toward hedging and force it into a default position of nuclear restraint. This section concludes this chapter by using the past case studies to explore what would indicate Saudi nuclear hedging.

³²² Hashim bin Abdullah Yamani, “The Kingdom of Saudi Arabia’s Speech,” 2016 Nuclear Security Summit in Washington, DC, April 1, 2016, <http://www.nss2016.org/document-center-docs/2016/4/5/national-statement-saudi-arabia>.

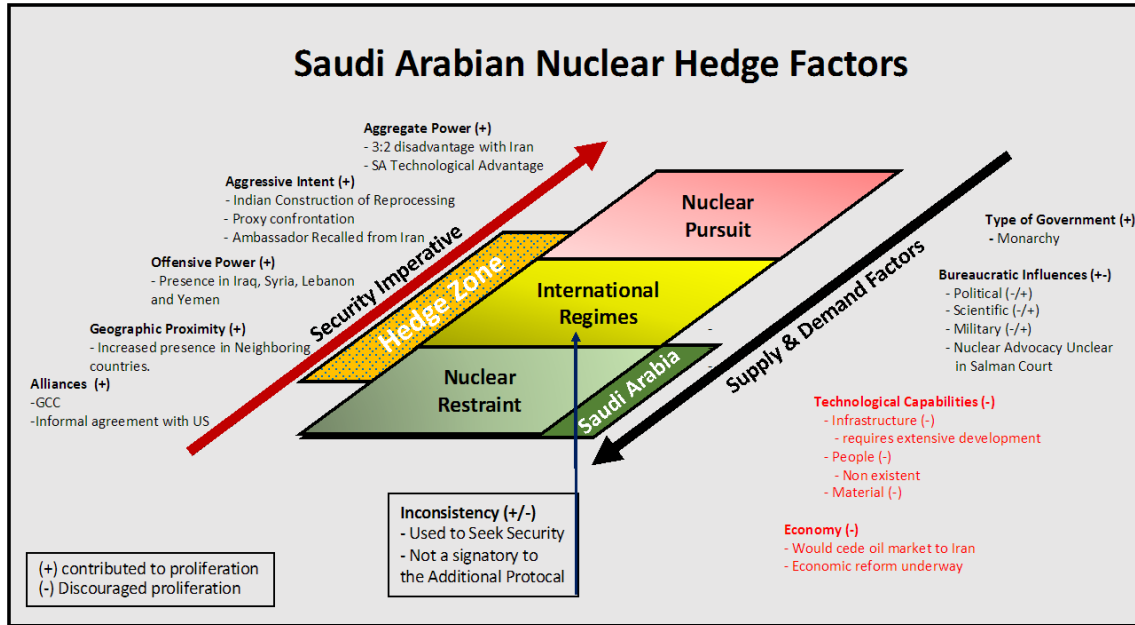


Figure 10. Saudi Arabian Nuclear Hedge Factors

Saudi Arabia's approach to this point has been sluggish. Its exploration of nuclear energy started in 2006 and has advanced in fits and starts ever since. A decade and an ambitious energy plan later, the Saudis have yet to put a shovel in the ground. The number one indicator of a change in Saudi Arabian policy would be progress toward its first reactor, and the type and origin of reactor would provide some indication of intention. Perhaps it would seek to imitate the Arak heavy-water reactor in Iran. Given that Saudi Arabia has yet to sign the additional protocol, its approach to IAEA safeguards in proposed design may prove a further indicator of intent. The initial Pakistani approach illuminates the relevance of initial procurement of nuclear infrastructure to a future weapons program. Perhaps, one would see the desire for parallel construction of nuclear facilities as demonstrated by the Pakistani experience.

Once the first reactors are constructed, an interest in energy security that manifests in an enrichment capability to offset Iran or a push toward nuclear reprocessing may provide an indicator toward hedging. Another indicator would be Saudi Arabia's final choice of vendor for nuclear power. Pakistan's partnership with China has proven beneficial to its nuclear program over the years. The preexisting missile relationship with

the Chinese may offer a foundation to build upon, but while Saudi Arabia is a Chinese energy partner, it does fill a strategic need the way Pakistan does. The Saudi approach to who runs its program may serve as an indicator as well. For example, a situation in which Saudi Arabia recruits a large proportion of its nuclear scientists from nuclear weapons states, such as Pakistan, Russia, or China, may be indicative of the direction the program seeks to take.

The development of the Saudi military industrial complex and how and what it chooses to produce is important. Development of dual-use aircraft or indigenous missile technology as its nuclear infrastructure progresses would serve as an indicator of the parallel development of delivery systems such as in the Pakistani case. The Japanese case has indicated that the development of space vehicles lends credibility to a hedge; perhaps an unlikely emergence of an indigenous Saudi space program would provide access to dual-use technology required to deliver a nuclear weapon. As with the nuclear energy development, the nature of industrial assistance can determine the trajectory; collaboration between the Chinese and Pakistanis help establish the Pakistan's military-industrial base. Perhaps a similar partnership would elucidate the direction of travel a Saudi program takes.

In summary, Saudi Arabia lacks the nuclear foundation and the supporting intellectual capital to pursue the indigenous nuclear program required for a nuclear hedging strategy. This position does not discredit the Saudi ability to overcome these barriers but purports that when Saudi Arabia breaks ground on its first nuclear reactor, an immediate reevaluation of the Saudi Arabian position is required. As Saudi Arabia progresses toward its energy plan, careful consideration should be given to the nations that assist it, the background of foreign scientists involved, the manner of construction of a nuclear complex, the desire for a fuel cycle, the attitudes displayed toward the IAEA and its safeguards, and concurrent military developments.

VI. CONCLUSION

A. FINDINGS

The intent of this thesis was to answer the questions of how the JCPOA affects Saudi Arabia and what actions the Saudis are likely to take as a result. The JCPOA left Iran with a residual capability that allows for the rapid development of nuclear weapons in a relatively short time, from months to years. The Saudi premise of “whatever they have, we will have” leans toward a Saudi Arabian nuclear-hedging strategy, but is such a strategy feasible? What does Saudi policy look like if Saudi Arabia chooses to match Iran? This thesis attempted to answer these questions by use of a model exploring the interaction of threat, domestic factors, such as national will and technical capability, and current international nonproliferation regimes as they pertain to nuclear hedging. This model proposed that high factors of threat drive nations to proliferate; domestic factors enable nations to proliferate; and international regimes moderate threats and provide reasons to reconsider proliferation. The interaction and strength of these forces determine the extent of proliferation, in other words, pursuit, restraint, or nuclear hedging. This chapter summarizes this approach and concludes with findings to these questions.

1. One Model, Three Different Cases, Three Different Outcomes

The proposed model explores the interaction between the factors of threat, domestic concerns, and international regimes. It proposes that within the calculation of threat, factors such as aggression, aggregate power, offensive power, proximity of regional adversaries, and the ability to offset with nuclear allies weigh heavily into the national calculus to entertain nuclear weapons. It also contends that domestic factors, such as the will of the people, expressed through political, military, and scientific communities, balanced by resident technical capabilities and economic concern, can affect the feasibility of a nuclear program. The third factor focuses on the attitudes and participation toward international regimes and the benefits of continued adherence or the consequences of deviation. It proposes within the intersection of these three factors that a propensity to adopt a policy of nuclear hedging exists. Chapter II explored the factors for

developing a conceptual model of proliferation states that weighed international relations and current proliferation theories. Chapter III applied the model to Pakistan, a state that in the face of a nuclear threat sought nuclear weapons. Chapter IV applied the model to Japan, a hedge state that possesses the prerequisite capacity to develop nuclear weapons rapidly yet refrains from doing so. Chapter V applied the model to Saudi Arabia, identifying a state that desires to compensate, but its infrastructure and consequences of action prohibit it from moving forward. Each case demonstrates a state at a different station of nuclear proliferation: a proliferent, a hedge, and restraint by default.

In the case of Pakistan, the advent of India's Trombay reprocessing capability in 1965 was not enough for Zulfikar Bhutto's bomb lobby to convince President Ayub Khan to explore nuclear weapons. It took a change in leadership, the trouncing of the Pakistani Army by India in 1971, and a peaceful Indian nuclear explosion in 1974 to coalesce national resolve to seek nuclear weapons. In light of these events, Pakistan mobilized the military, scientific, and political communities to bridge seemingly insurmountable gaps to achieve nuclear parity with India. Zulfikar Bhutto led the nation toward this goal by reducing government bureaucratic barriers and seeking international investment to fund the endeavor. The military supported the procurement ring and technological transfers that enabled the scientific community to produce a bomb. The scientific community was impoverished in facilities and material but not in intellectual capacity. The Atoms for Peace project helped develop a nuclear scientific community that established its technological base. The Pakistanis viewed nonproliferation regimes as bigoted toward lesser-developed nations and a hurdle to jump over—the nation subsequently developed a norm of “norm defiance.”

In Pakistan, the element of threat united the nation to pursue nuclear weapons over the benefits of existing relationships and international regimes. Misaligned alliances tilted Pakistan toward security independence through proliferation. The United States sought to counter Soviet influence in South Asia while Pakistan needed security vis-à-vis India. The immediacy of countering the threat with India opened the door for foreign collaboration, such as with China, which greatly enabled the program. Existential threats and the favorable domestic factors of bureaucratic cohesiveness forged a Pakistani

national unity that overcame the negative consequences of economic loss and potential reproach to negate the coercive power of international regimes.

Japan's experience differed greatly from Pakistan. Post-World War II Japan emerged with a predetermined security arrangement with the United States. This arrangement allowed the Japanese to focus on economic recovery, and the Japanese further codified it through its Yoshida Doctrine. The mutual defense of this agreement converged interests in countering communism, a proximate threat to Japan emanating from China, the USSR, and North Korea. In the 1950s, the United States introduced the peaceful use of nuclear energy to Japan under the Atoms for Peace plan to offset the negative images of the U.S. hydrogen bomb test at Bikini Atoll, and a nuclear energy industry soon emerged. In the aftermath of the Chinese nuclear test of 1964, Prime Minister Sato was able to review the feasibility of nuclear weapons based on the indigenous nuclear capacity resident in Japan. This study was important to shaping the hedge seen in Japan today. It identified the cost of continued reliance on U.S. security, both materially and strategically, and an independent deterrent. Japan developed a variant of the first option by advocating security dependence on the United States while encouraging the development of nuclear infrastructure necessary for its hedge.

Japan's accession to the NPT was remarkable for the informal guarantee seeking from the United States that the NPT would not affect its ability to reprocess plutonium. This was instrumental to its hedging strategy as reprocessing gives Japan rapid and independent access to plutonium should it revisit its position on nuclear pursuit. With the rising threat of a nuclear North Korea and an increasingly assertive China, Japanese politicians, such as Shinzo Abe, are encouraging the discussion of an independent nuclear deterrent. This is an emotional issue for the Japanese as it is the only nation to have suffered from atomic bombings. These bombings left an indelible scar on the Japanese psyche that has led the population to abhor nuclear weaponry. Scholars refer to this phenomenon as the "nuclear allergy." This allergy makes Japan a staunch nonproliferation advocate and creates domestic friction between the people and government when the topic arises.

Today, Japan leverages its hedge to ensure synchronicity of U.S.–Japanese security concerns. Its formidable domestic factors, such as a foreign-trade dependent economy and the political discord from its population, coupled with its nuclear allergy and high regard for nonproliferation norms, counter-balance the security incentives of nuclear pursuit. Meanwhile, Japan’s domestic nuclear capacity and its ability to produce an indigenous nuclear weapon rapidly create a fertile environment for nuclear pursuit should its threat calculus spike and domestic and international barriers recede.

The Iranian nuclear drama sparked another dimension of regional competition between Iran and Saudi Arabia. The signing of the JCPOA highlighted the advanced state of Iran’s nuclear program while leaving a residual nuclear hedging capability in Iran. From the realist perspective of security that is prevalent in the Middle East, any perceived gain comes at a loss for another state. As such, Saudi Arabia finds itself engaged with Iran on multiple fronts besides nuclear competition. The first is the battle for influence in Iraqi politics; the second is on its border against Iranian-backed Houthi rebels in Yemen; the third is in Syria, where Saudis would like to see Assad ousted; and the fourth is in Lebanon, where each nation courts Hamas. In 2016, the Iranian–Saudi relationship hit an all-time low when the Iranians stormed the Saudi mission in Teheran, setting it ablaze after the Saudis beheaded a prominent Shia cleric. Compounding matters with Iran, Saudi Arabia has to contend with the growing specter of ISIS challenging the legitimacy of the Kingdom. Saudi Arabia also harbors doubts about its traditional security partner, the United States—stemming from its willingness to deal with Iran—and seeks to mend relationships with its traditional security partner Pakistan.

In the run up to the signing of the JCPOA, Saudi Arabia voiced its desire to compensate, but there remains a rift between talk and action. As Saudi Arabia explores what it takes to compensate, it finds the daunting task of building nuclear capacity from an empty cupboard of indigenous nuclear scientists and a nonexistent nuclear infrastructure. It also finds an economy that is in transition and a military engaged with Iranian proxies. While threat is high, there remains a lack of national infrastructure to match the leadership’s desire to match nuclear capability vis-à-vis Iran. Furthermore, Saudi Arabia’s slow progress toward building a nuclear enterprise indicates a lack of

urgency in compensating for Iran. While Saudi Arabia is a signatory of the NPT, its declarative statements indicate it would not hesitate to deviate.

The Iranian threat motivates Saudi Arabia to compensate. Iran presents a local, aggressive, and formidable threat that, after the JCPOA, emerges from international sanctions in a position to enhance its military and latent strengths. Saudi allies provide questionable reassurance to the protector of the Muslim holy land. International regimes seem unlikely to dissuade Saudi Arabia from matching Iran, but domestic factors, specifically a malnourished scientific community, hinder the Saudis' hedging options. Subsequently, the technical challenges force Saudi Arabia to accept a default position of nuclear restraint.

This thesis explored three different cases to conclude the approach a nation takes toward nuclear weapons—pursuit, hedging, or restraint—is determined by the interaction of three factors: threat, domestic factors, and international regimes. The findings suggest that Saudi Arabia, while currently adopting a position of restraint, is unlikely to continue that strategy if it feels sufficiently threatened by Iran. Figure 11 offers an abbreviated comparison of the cases and highlights the differences among factors in each case. In Pakistan's case, alliances did not offset the Indian threat. Domestically its bureaucracy aligned in favor of nuclear pursuit. It did not have a strong nuclear enterprise, but it had the intellectual capacity to develop the program. It sought creative ways to collaborate for technological transfers and mobilized the Arab community to finance the endeavor. The newly formed NPT and threat of international sanctions does not undermine Pakistan's determination to pursue weapons. Japan represents a country living under the threat of nuclear shadows that can go nuclear—but asks whether it should it go nuclear. In its calculus, Japan places value on the extended deterrence of the United States and seeks innovative ways to guarantee that U.S. and Japanese security interests converge. While Japan has the tools to go nuclear, politicians face angering a public who is supportive of nonproliferation norms based on the national nuclear allergy stemming from the end of World War II. In Japan, the discord between threat and domestic factors that is enhanced by nonproliferation norms creates an environment for nuclear hedging. Saudi Arabia represents a nation that indicates it would like to hedge to match its adversary's capability

regardless of international regimes. Despite its desire, the Saudis' technical capacity and transitory economy limit its ability to compete with Iran. These factors combine to leave Saudi Arabia in a default position of nuclear restraint.

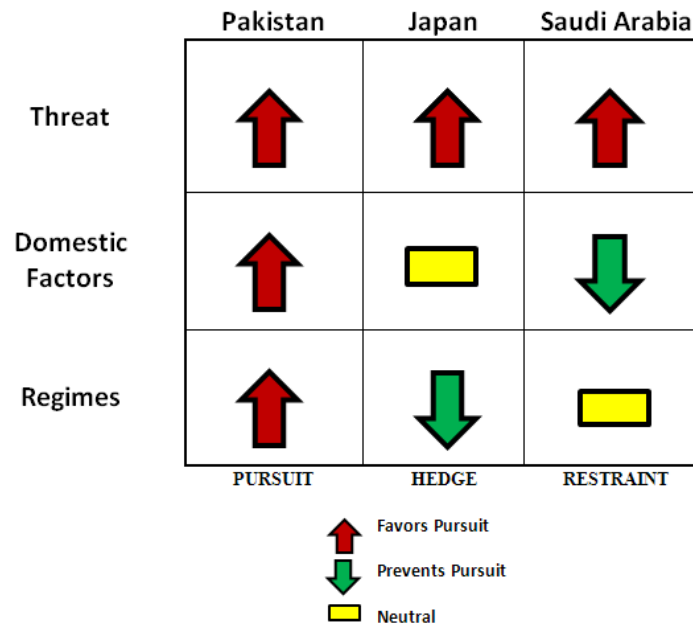


Figure 11. Side-by-Side Case Study Comparison

B. IMPLICATIONS

The previous section answered the main thesis question of how the Iranians motivated Saudi Arabia to acquire a nuclear capability to match or surpass their own and highlighted the Saudi Arabian inability to compete. This section explores the reoccurring themes of alliances and technological capability and concludes with a checklist for an emerging Saudi nuclear infrastructure should the shovel hit the ground.

1. Alliances Matter

In all cases, the United States is prevalent in the security paradigms. Pakistan has viewed the United States as a counter to India whereas the United States has viewed Pakistan as part of its bulwark to communism. This incongruity has manifested in Pakistan's defeat at the hands of the Indians. This defeat has led to a desire for Pakistani security independence.

In Japan, the United States alliance is valued and congruent with the threats Japan faces. Japan reemerged from World War II dependent on the United States for security. As new threats, such as China, emerged, the United States was quick to allay Japanese fears with the extension of its nuclear umbrella. At roughly the same time, Japanese leadership had the foresight to invest in the necessary capabilities to create the capacity to build nuclear weapons should U.S. security guarantees ebb. Japan has perfected the maintenance of this alliance, and each time a new threat emerges, talk of a Japanese deterrent is usually enough to reaffirm U.S. security guarantees.

In Saudi Arabia, the value of U.S. security treads water. On one hand, the Saudis question the U.S.-led efforts to make a deal with Iran at the expense of their security. On the other hand, U.S. armaments fuel Saudi Arabia's penchant for high-tech weaponry and current fight in Yemen. Increased U.S. dialogue with Iran or even rapprochement could cause a divergence in the U.S.–Saudi relationship. Saudi Arabia's development of its own defense industry as described in "Vision 2030," or shifting equipping and training of its armed forces to another country such as Pakistan would indicate the declining value of the U.S.–Saudi alliance and signal a Saudi move toward security independence.

2. Technology Matters

The Pakistan case study elucidates the importance of specialized personnel to enable a nuclear program. Pakistan's intellectual capacity has fueled its capacity to go nuclear. Japan's advanced nuclear fuel cycle and its standing as a technologically advanced nation serves as a backbone to its nuclear hedge. It is not a matter of whether they can produce a bomb but when they choose to do so. Japan is often referred to as a virtual nuclear nation based on these facts. Understanding that Saudi Arabia lacks both the intellectual capacity and the development to field nuclear energy, Table 5 explores what indicators and warnings Saudi Arabia might present if it develops nuclear infrastructure.

Table 5. Indicators and Warnings

Indicator	Warning	Rationale
Alliances		
- Security interests	U.S. and Saudi approaches to Iran diverge.	In the Pakistani case, diverging interests drove Pakistan to seek independent nuclear deterrence.
- Security independence	The nation is diversifying its military suppliers or seeking to establish its own military establishment.	Pakistan felt the brunt of the arms embargo in 1965. Security interests emphasized the need for indigenous military industrial complex.
Establishment of Nuclear Facilities		
- Type of Reactor	Saudi Arabia seeks a heavy-water reactor over a light-water reactor.	Proliferation risks elevate with different reactor designs. Light-water reactors pose less of a proliferation risk.
- Country of Origin	Saudi Arabia seeks Russian or Chinese designs over Japanese, Korean, or U.S. designs.	China has shown willingness to proliferate in the Pakistani case. Russia has provided Iran's current nuclear reactors
- Nuclear fuel cycle	Saudi Arabia asserts its right to enrich or reprocess.	These technologies enable the development of highly enriched uranium and plutonium.
- Parallel Construction	Saudi Arabia seeks to build mirrored capabilities elsewhere.	Pakistan took this approach in the 1970s. It sought to import nuclear technologies to mirror in its military applications.
Investment in Human Capital		
- Overseas Education	Saudi Arabia sends students abroad to acquire education in supporting disciplines (e.g., metallurgy, nuclear chemical, and explosive engineering).	An increased effort to develop an indigenous scientific base may indicate proliferation. It is also important as to where education takes place. Exchange with Pakistan or China may elevate proliferation concerns.
- Foreign Recruitment	Saudi Arabia seeks foreign scientists from a country with established nuclear weapons program	An influx of foreign scientists and their background may indicate the nature of the direction of a Saudi Arabian nuclear program. Chinese assistance was vital in the Pakistani case.

C. FINAL WORDS

Through case study exploration, this thesis found that threat favors nuclear pursuit, and threat may be mitigated by an alliance with a nuclear nation whose security interests converge. This thesis also found that nations facing nuclear threat without favorable domestic factors, such as supporting bureaucracies or technological capabilities, are forced into a default position of nuclear restraint. In cases whereby threat and a majority of domestic factors support nuclear pursuit, such as in Japan, international regimes and security alliances provide incentives to adopt a nuclear hedge versus nuclear pursuit. In the case of Saudi Arabia, a high threat and tenuous alliances favor nuclear pursuit, but underdeveloped domestic factors, such as a lacking scientific community and nuclear infrastructure, force a policy of restraint. Saudi Arabia's attitude toward international regimes portends that the country will seek weapons if it possesses the key technological requirements. Under these circumstances, nuclear energy and technological development in Saudi Arabia deserves constant evaluation. The value of this thesis is that it offers a qualitative method for comparing and contrasting past and contemporary proliferation cases against a current proliferation concern to develop a deeper understanding. While this thesis focused on the Iranian–Saudi Arabian relationship, the residual capability in Iran may drive other nations, such as Egypt and the United Arab Emirates, to seek similar approaches—and these cases will deserve similar evaluation.

1. DOD Implications

In 2014, the Department of Defense published a countering weapons of mass destruction (CWMD) strategy focused on the strategic ends of denying state and non-state WMD acquisition, use, and—if used—mitigation.³²³ To achieve these effects, the DOD seeks to reduce incentives for actors that own and use WMDs; increase the difficulty in acquisition and use of WMDs; manage WMD risk from failed or failing

³²³ The Department of Defense, Strategy for Countering Weapons of Mass Destruction (Washington, DC: Department of Defense, June 2014), 7, <https://news.usni.org/2014/06/30/document-pentagon-strategy-countering-weapons-mass-destruction>.

nations; and deny the effects of WMD use.³²⁴ This strategy has provided the overarching guidance for the enterprise, particularly the United States Strategic Command, the functional combatant commander (FCC) for CWMD. Meanwhile, the United Special Operations Command (USSOCOM) has planned and prepared to execute WMD crisis response and is responsible for conducting operational preparation of the environment for the Geographic Combatant Commanders. This has created a disconnect between the side of the FCC responsible for planning for CWMD eventualities and the side of the FCC responsible for training, manning, and equipping the force to prepare to respond to WMD crises.

The president's recent shift of countering weapons of mass destruction (CWMD) responsibilities to the United Special Operations Command (USSOCOM) from the United States Strategic Command at the behest of the Secretary of Defense represents an evolution of the DOD policy. USSOCOM's traditional role in CWMD is responding to crisis to delay, disrupt, destroy, or neutralize WMDs. As USSOCOM takes on expanded CWMD tasks, it will need to need to understand the contemporary operating environment to develop strategies and capabilities to leverage against current and future proliferants. Developing these strategies demands a deeper understanding of proliferating nations and non-state actors. This deeper understanding informs senior decision-makers when allocating scarce resources already arrayed against pressing terrorism threats—such as ISIS. Detailed studies will inform senior leadership as it contemplates strategies to address new mission requirements. This thesis is part of developing that deeper understanding.

³²⁴ Ibid.

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